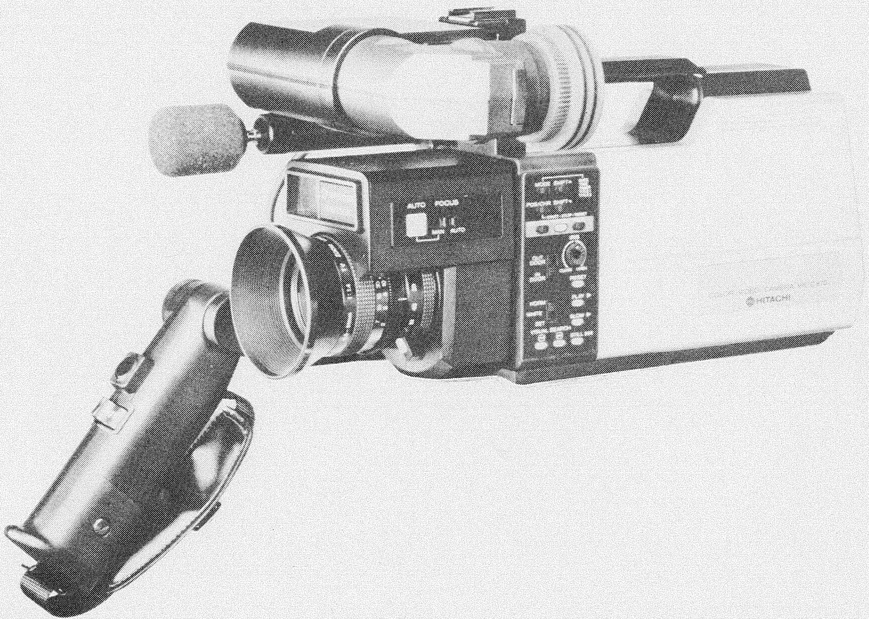
HITACHI SERVICE MANUAL

TK

No. 2066E

VK-C870E

Technical Information



SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

Jan. 1984

TOKAI WORKS

CONTENTS

POWER SUPPLY AND INTERFACE CIRCUITS

1. Power supply distribution 2
2. Sync generator circuit 4
3. VTR trigger circuit 4
4. Playback detection circuit 5
5. Low battery detection/power save output circuit 5
6. Zoom motor control circuit 6
7. Audio/earphone amplifier circuit 6
8. Fade control circuit 7
9. VTR remote control circuit 8
10. Auto focus control circuit 8

SATICON DEFLECTION CIRCUITS

1. Horizontal saw/para signal generator and deflection circuit 9
2. Vertical saw/para signal generator and deflection circuit 9
3. Saticon blanking circuit 10
4. Bias light circuit 10
5. Automatic beam optimizer circuit 10
6. Dynamic focus correction circuit 11
7. High voltage circuit 11

SIGNAL PROCESSING CIRCUITS

1. Preamplifier circuit 12
2. Prevideo processing circuit 12
3. AIC circuit 13
4. Luminance processing circuit 14
5. Vertical edge correction signal generator circuit 15
6. Red/Blue separation circuit 16
7. Red/Blue gain control and detector circuits 17
8. Auto white balance control circuit 18
9. Chroma encoder circuit 19
10. Video processing and Neg/Pos inversion circuit 20

CHARACTER SIGNAL GENERATOR CIRCUITS

1. Key matrix circuit 22
2. Character signal generator control microprocessor input/output composition 22
3. Character signal generator circuit 24
4. Clock circuit 25
5. Frame divider circuit 26

HOW TO READ ABBREVIATIONS

ABO	Automatic beam optimizer
AIC	Automatic iris control
AUDIO IN	Audio signal input
AUDIO GND	Audio circuit ground
AUDIO OUT	Audio signal output
AWB	Automatic white balance
Bc	Blue subcarrier signal
BF	Burst flag pulse
BSC	Burst subcarrier signal (0°/270°)
B	Blue signal
B-YL	B-YL color difference signal
CHARACTER	Character signal
CHROMA	Chrominance signal
CP1	Clamp pulse 1
CP2	Clamp pulse 2
C1 - C5	Key matrix scan signals
C BLK	Composite blanking signal
$\overline{\mathrm{C\ SYNC}}$	Composite sync signal
D5V	Direct 5V (Always 5V)
D9V	Direct 9V (Always 9V)
D–3V	Direct –3V (Always –3V)
EAR	Earphone jack
EVF	Electronic viewfinder
EXT MIC	External microphone jack
FADE	Fade signal
HORIZ SAW	Horizontal rate sawtooth signal
HORIZ PARA	Horizontal rate parabolic signal
H SYNC	Horizontal sync signal
INT MIC	Internal microphone jack
LOW BATT	Low battery signal
LOW LIGHT	Low light signal
LDI	Instruction data latch signal
L1 - L4	Mode detecting signals
M5V	On 5V (Power save 0V)
NEG	Negative
OB	Optical black
POS	Positive
PREVIDEO	Prevideo signal
Rc	Red subcarrier signal
RETURN AUDIO	Return audio signal
$\overline{\mathrm{REC}}$9	Except recording 9V
R-YL	R-YL color difference signal
SC1	Subcarrier signal 1 (180°)
SC2	Subcarrier signal 2 (90°/270°)
TELE	Telephoto
VERT EDGE	Vertical edge signal
VERT SAW	Vertical rate sawtooth signal
VERT PARA	Vertical rate parabolic signal
VP	Vertical pulse
V SYNC	Vertical sync signal
WHD	Wide horizontal drive pulse
WIDE	Wide
W/B	White balance signal
Y	Luminance signal
YH	Luminance signal (High component)
YL	Luminance signal (Low component)
$\gamma 1 - \gamma 3$	Tracking correction signals
1.8V	1.8V reference voltage
2.7V	2.7V reference voltage
5V	On 5V (Power save 0V)
6.2V	On 6.2V (Power save 0V)
9V	On 9V (Power save 0V)

POWER SUPPLY AND INTERFACE CIRCUITS

1. Power supply distribution (Fig. 1-1)

12 volts, supplied either from VTR or from the camera power supply unit, provide B+ source to the color-camera. The 12 volt power source is supplied via fuse F601 to the switching regulator circuits on the deflection circuit board. The regulated 9V B+ source is supplied to the electronic viewfinder, audio, VTR interface, deflection and process circuit boards. This 9V B+ source is futher regulated via the 6.2V regulator Q17 down to the 6.2V B+ source which is supplied to the sync generator circuit board. The regulated 5V B+ source is supplied to the process, deflection circuits, etc. These two B+ sources from the switching regulator circuit composed of IC451, Q451, Q452, Q455 and Q456 are generated when the power save switch is in the "OPERATE" position. The 12 volt power source is also applied to the switching circuit composed of IC452, Q453, Q454, Q457 and T451. The regulated D9V B+ source is supplied to the VTR interface and deflection circuit boards. The regulated D5V B+ source is supplied to the auto white balance, VTR control and microprocesser 1 and 2 circuit boards. The regulated D-3V B+ source is supplied to heater of Saticon. These three B+ sources are always generated whenever the camera is plugged into a VTR that is turned "on". The regulated M5V B+ source is supplied to the microprocesser 1 and 2 circuit boards and auto focus block, and is generated when the power save switch is in "OPERATE" position. When the power save switch SW1004 is placed in the "PWR SAVE" position, 9V, 6.2V, 5V and M5V B+ sources become 0V, thereby the camera power consumption is minimized.

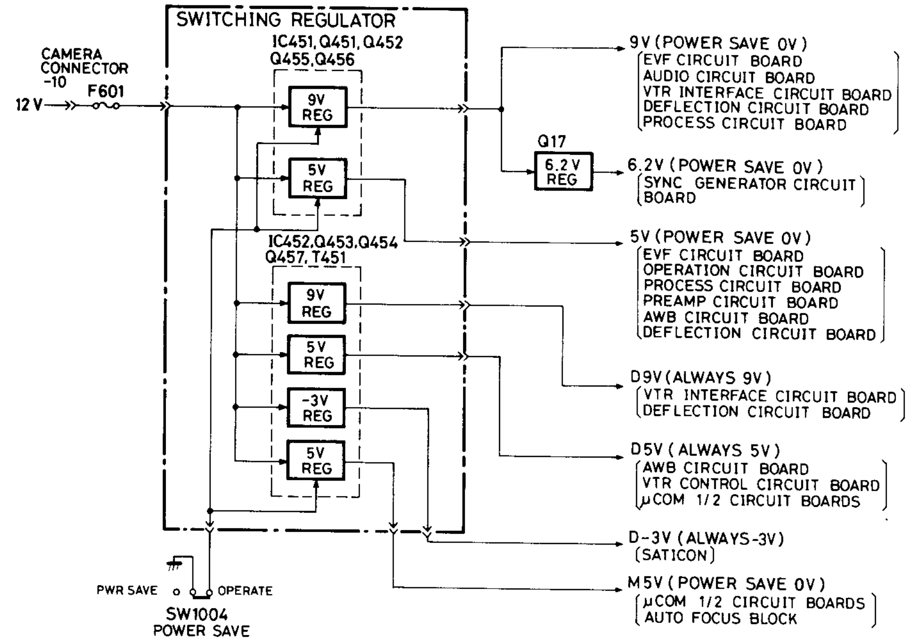
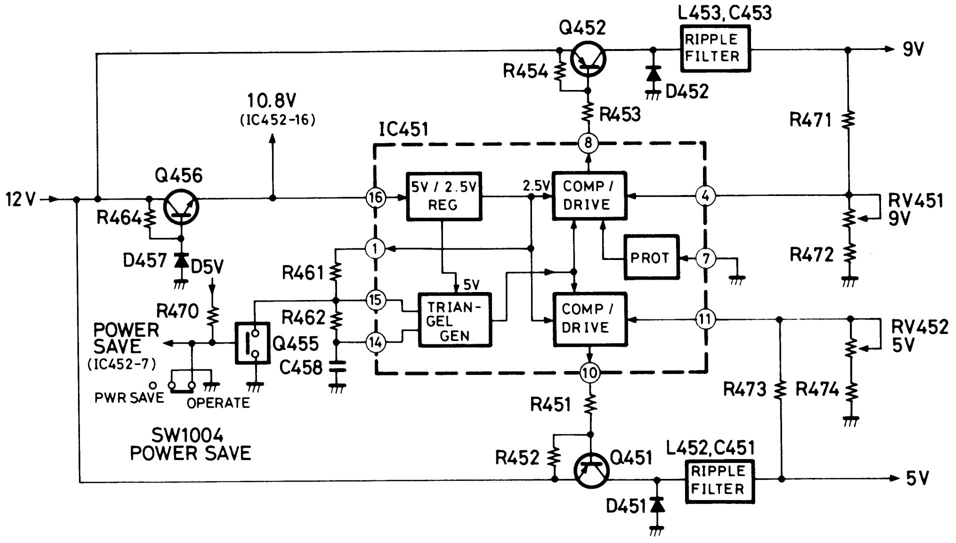

SWITCHING REGULATOR
IC451, Q451, Q452
Q455, Q456
CAMERA CONNECTOR -10
F601
12 V
9V REG
5V REG
IC452, Q453, Q454
Q457, T451
9V REG
5V REG
-3V REG
5V REG
Q17
6.2V REG
9V (POWER SAVE 0V)
EVF CIRCUIT BOARD
AUDIO CIRCUIT BOARD
VTR INTERFACE CIRCUIT BOARD
DEFLECTION CIRCUIT BOARD
PROCESS CIRCUIT BOARD
6.2V (POWER SAVE 0V)
SYNC GENERATOR CIRCUIT BOARD
5V (POWER SAVE 0V)
EVF CIRCUIT BOARD
OPERATION CIRCUIT BOARD
PROCESS CIRCUIT BOARD
PREAMP CIRCUIT BOARD
AWB CIRCUIT BOARD
DEFLECTION CIRCUIT BOARD
D9V (ALWAYS 9V)
VTR INTERFACE CIRCUIT BOARD
DEFLECTION CIRCUIT BOARD
D5V (ALWAYS 5V)
AWB CIRCUIT BOARD
VTR CONTROL CIRCUIT BOARD
μCOM 1/2 CIRCUIT BOARDS
D-3V (ALWAYS -3V)
(SATICON)
M5V (POWER SAVE 0V)
μCOM 1/2 CIRCUIT BOARDS
AUTO FOCUS BLOCK
PWR SAVE
OPERATE
SW1004
POWER SAVE

Fig. 1-1 Power supply distribution

1-1. 9V, 5V B+ source circuit (Fig. 1-2)

The 12V source is applied to the 5V/2.5V reference voltage regulator in IC451 through the protection circuit composed of Q456 and D457 which prevents the IC from breaking down due to overcurrent. The 5V reference is applied to the triangle signal generator circuit which generates the triangular signal by C458, R461 and R462. This triangular signal is applied to two comparator/driver circuits which compare with the voltages between 2.5V reference voltage and input voltage, and outputs the pulse-width-modulated signal to drive the regulator. The output voltage from regulator Q452 is applied through the ripple filter circuit composed of L453 and C453 to the resistor divider network. The voltage adjusted by the 9V output voltage control RV451 is applied to the comparator circuit, and it is compared with the reference voltage. The driver circuit generates a pulse-width-modulated signal depending on this compared voltage, therefore, the constant 9V regulated B+ source is obtained.

The 12V source is also regulated down to the 5V B+ source via the 5V regulator circuit the same as the 9V regulator circuit. When the power save switch SW1004 is placed in the "OPERATE" position, the D5V B+ source is grounded through R470 and SW1004, thus causing Q455 to turn "off". Therefore, the triangle generator in IC451 generates a triangular signal whose frequency is approx. 57 kHz. However, SW1004 is placed in the "PWR SAVE" position, "Hi" voltage is applied to the base of Q455 from the D5V B+ source. Q455 turns "on" by this "Hi" voltage input, thus causing the triangle generator in IC451 to turn "off". Therefore, the both the 9V and 5V B+ sources become 0V.



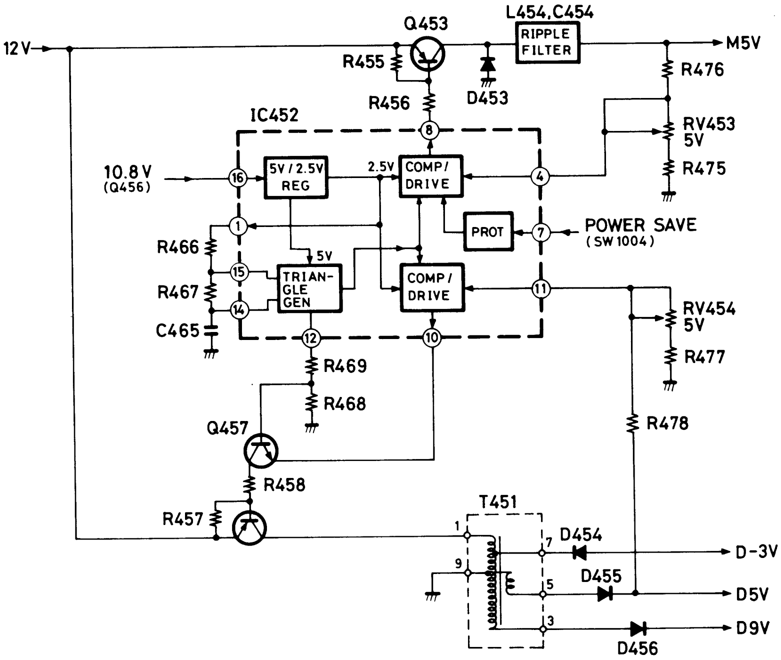
Q452
L453,C453
RIPPLE FILTER
9V
R454
D452
10.8V
(IC452-16)
R453
IC451
R471
Q456
12V
R464
5V / 2.5V REG
2.5V
COMP / DRIVE
RV451
9V
D457
D5V
R461
PROT
R472
5V
R470
POWER SAVE
(IC452-7)
R462
TRIAN-GEL GEN
COMP / DRIVE
RV452
5V
Q455
C458
PWR SAVE
OPERATE
R473
R474
R451
SW1004
POWER SAVE
R452
Q451
L452,C451
RIPPLE FILTER
5V
D451

Fig. 1-2 9V, 5V B+ source circuit

1-2. D9V, D5V, D-3V, M5V B+ source circuit (Fig. 1-3)

The M5V B+ source is generated by the M5V switching regulator circuit composed of IC452 and Q453 the same as the 9V and 5V switching regulator circuit composed of IC451, Q452 and Q451 when the "Lo" voltage is applied to the protection circuit in IC452 through pin 7. This means that the power save switch SW1004 is placed in the "OPERATE" position. When SW1004 is placed in the "PWR SAVE" position, the M5V B+ source becomes 0V by inputting the "Hi" voltage of approx. 2V.

The D9V, D5V and D-3V B+ sources are always generated whenever the camera is plugged into a VTR that is turned "on".



Q453
L454,C454
RIPPLE FILTER
M5V
12V
R455
R476
R456
D453
IC452
RV453
5V
10.8V
(Q456)
5V/2.5V REG
2.5V
COMP/ DRIVE
R475
POWER SAVE
(SW1004)
PROT
R466
5V
TRIAN-GLE GEN
COMP/ DRIVE
R467
RV454
5V
C465
R469
R477
R468
Q457
R478
R458
T451
R457
D454
D-3V
D455
D5V
D9V
D456

Fig. 1-3 D9V, D5V, D–3V, M5V B+ source circuit

2. Sync generator circuit (Figs. 1-4 and 1-5)

A 17.73 MHz crystal is connected between pins 2 and 3, which produces the 17.734475 MHz signal. This reference frequency is divided by 4 to produce the 4.43 MHz subcarrier signals. The voltage controlled oscillator produces the 4.40625 MHz signal synchronized with the 4.43 MHz subcarrier signal. This 4.40625 MHz reference frequency is divided by 282 to produce the horizontal pulse with a frequency of 15.625 kHz, wide horizontal drive pulse (WHD), clamp pulse 1 (CP1) and clamp pulse 2 (CP2). The 4.40625 MHz signal is also divided by 88125 to produce the vertical pulse with a frequency of 50 Hz, vertical pulse (VP). In addition, composite pulses; burst flag pulse (BF), burst subcarrier signal (BSC), composite blanking (C BLK) and composite sync ($\overline{\text{C SYNC}}$) are produced from the horizontal frequency pulses and vertical frequency pulses. These signals are applied to the various circuits. The WHD, CP1, CP2 and C BLK pulses are added together and applied via one pin to various ICs to accomplish some of the necessary functions in the signal processing circuits. The IC separates the combined signals and applies each signal to the appropriate internal circuit. The sync generator output timing diagram (shown in Fig. 1-5) shows the timing sequence of the various horizontal/vertical output signals.

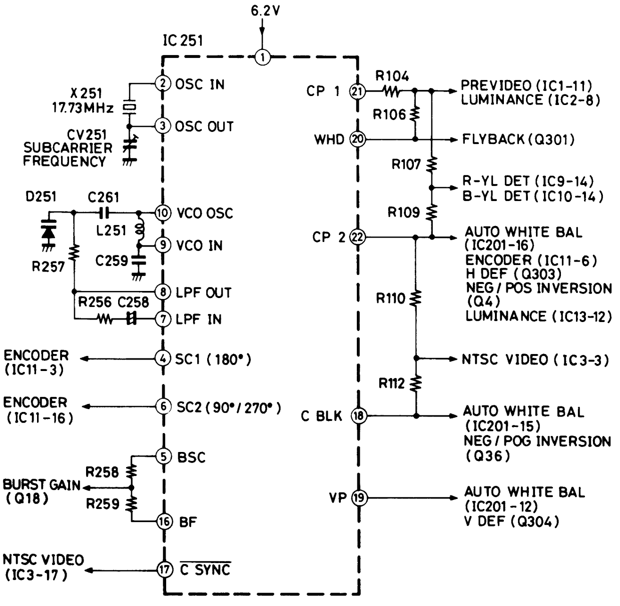

6.2V
IC 251
①
X251
17.73MHz
② OSC IN
③ OSC OUT
CV251
SUBCARRIER
FREQUENCY
D251
C261
⑩ VCO OSC
L251
⑨ VCO IN
R257
C259
⑧ LPF OUT
R256 C258
⑦ LPF IN
ENCODER
(IC11-3)
④ SC1 (180°)
ENCODER
(IC11-16)
⑥ SC2 (90°/270°)
⑤ BSC
R258
BURST GAIN
(Q18)
R259
⑯ BF
NTSC VIDEO
(IC3-17)
⑰ $\overline{\text{C SYNC}}$
CP 1 ㉑
R104
R106
PREVIDEO (IC1-11)
LUMINANCE (IC2-8)
WHD ⑳
FLYBACK (Q301)
R107
R-YL DET (IC9-14)
B-YL DET (IC10-14)
R109
CP 2 ㉒
AUTO WHITE BAL
(IC201-16)
ENCODER (IC11-6)
H DEF (Q303)
NEG / POS INVERSION
(Q4)
LUMINANCE (IC13-12)
R110
NTSC VIDEO (IC3-3)
R112
C BLK ⑱
AUTO WHITE BAL
(IC201-15)
NEG / POG INVERSION
(Q36)
VP ⑲
AUTO WHITE BAL
(IC201-12)
V DEF (Q304)

Fig. 1-4 Sync generator circuit

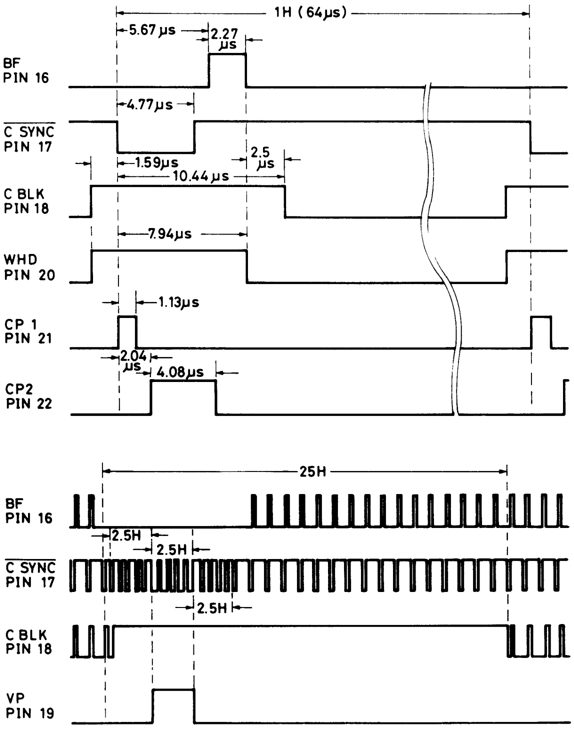

1H (64μs)
5.67 μs
2.27 μs
BF
PIN 16
4.77μs
$\overline{\text{C SYNC}}$
PIN 17
1.59μs
2.5 μs
10.44 μs
C BLK
PIN 18
7.94μs
WHD
PIN 20
1.13μs
CP 1
PIN 21
2.04 μs
4.08μs
CP2
PIN 22
25H
BF
PIN 16
2.5H
2.5H
$\overline{\text{C SYNC}}$
PIN 17
2.5H
C BLK
PIN 18
VP
PIN 19

Fig. 1-5 Sync generator output timing diagram

3. VTR trigger circuit (Fig. 1-6)

When the VTR is placed in a mode other than record, "Hi" voltage of the $\overline{\text{REC9}}$ signal is applied to pin 12 of the microprocessor IC801 from the VTR. Therefore, the VTR trigger operation is disabled if the VTR trigger switch SW1061 is pressed.

When the VTR is placed in the record mode, the $\overline{\text{REC9}}$ signal becomes "Lo" and cause IC801 to generate a "Lo" voltage. When the pause polarity switch SW1-2 is set to "−", the "Lo" voltage is inverted via Q602 and is then applied to the VTR through the camera connector. As a result, the VTR through the camera connector. As a result, the VTR which is controlled by pause "Hi" is set to the pause mode. When the VTR trigger switch SW1061 is pressed, Q951 turns "on", therefore, the C4 signal of the 4 key matrix scan signals is applied to pin 44 of IC801. As a result, IC801 detects the VTR trigger mode, and pin 20 of IC801 becomes "Hi" voltage, causing Q601 to turn "on". As a result, the "Lo" voltage is applied to the VTR through the camera connector, causing the VTR mode to change to record from pause.

When the pause polarity switch SW1-2 is set to "+", the "Lo" voltage generated via pin 20 of IC801 is inverted twice by Q601 and Q602, therefore, "Lo" voltage is applied to the VTR. As a result, VTRs which are controlled by pause "Lo" are set to the pause mode. When the VTR trigger switch SW1061 is pressed again, "Hi" voltage is applied to the VTR to set to the record mode from the pause mode.

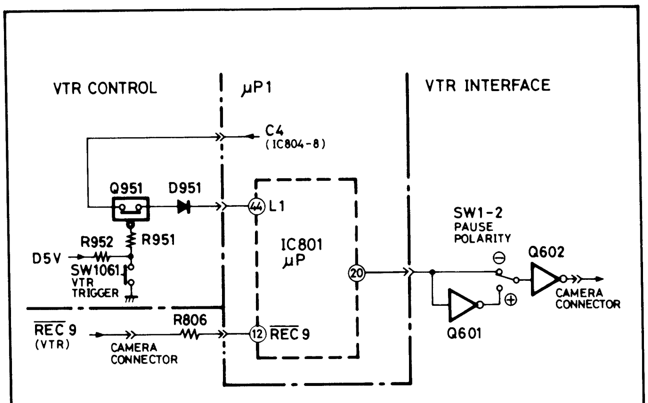

VTR CONTROL
μP1
VTR INTERFACE
C4
(IC804-8)
Q951
D951
L1
R952
R951
D5V
SW1061
VTR TRIGGER
IC801
μP
SW1-2
PAUSE POLARITY
Q602
CAMERA CONNECTOR
R806
REC 9
(VTR)
CAMERA CONNECTOR
REC 9
Q601

Fig. 1-6 VTR trigger circuit

4. Playback detection circuit (Fig. 1-7)

During camera recording, the video output signal processing circuits in the camera generate a video output signal which is applied through the buffer amplifiers Q607 and Q608 to the filter circuit composed of R611 and C602. The filtered video signal becomes approx. 2V DC and is applied to the noninverting input, pin 5, of the comparator, IC601 (2/2). The reference voltage at the inverting input, pin 6, applied from the 9V B+ source through the resistor divider network circuit composed of R609 and R610, is approx. 2.5V. Therefore, the output of IC601 (2/2) at pin 7 becomes a "Lo" voltage. This "Lo" voltage is applied to Q609, causing Q609 to turn "off". Therefore, the video signal output from the signal processing circuits is applied to the VTR through the camera connector and it is also applied to the EVF and character generator circuits through the pause polarity switch SW1-1 and buffer amplifiers Q603 and Q605. At the same time, "Lo" voltage from the comparator is applied to the switching Q969 of the key matrixing circuits on the VTR control circuit board, thus causing Q969 to turn "on". As a result, the signal C5 of the scan signals is applied through Q969 and D962 to the microprocessor circuit, therefore, the REC graphics will be displayed in the EVF.

During playback, the DC level of the video input/output line from the VTR is shifted to approx. 7V DC by the VTR playback circuit. The DC shift is applied to the noninverting input, pin 5, of the comparator IC601 (2/2). This input voltage is higher than the reference voltage at pin 6, therefore, the output of IC601 (2/2) becomes "Hi". This "Hi" voltage is applied to Q609, causing Q609 to turn "on", thus grounding the video signal from the signal processing circuit. As a result, the playback video signal from the VTR flowing through the video input/output line can be seen in the EVF. The "Hi" voltage from IC601 (2/2) is also applied to Q969, causing Q969 to turn "off". The microprocessor circuit detects the playback mode by Q699 turning "off".

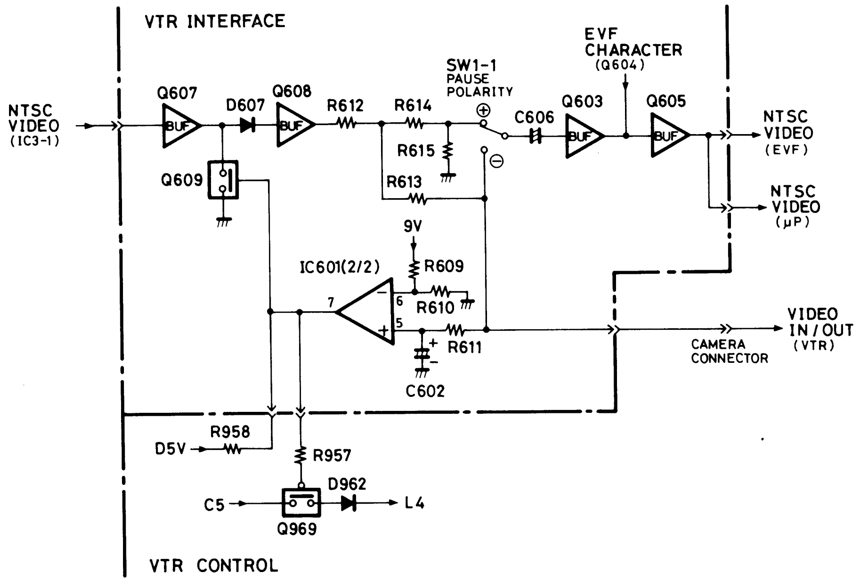

VTR INTERFACE
NTSC VIDEO (IC3-1)
Q607
D607
Q608
R612
R614
SW1-1
PAUSE POLARITY
EVF CHARACTER (Q604)
C606
Q603
Q605
NTSC VIDEO (EVF)
R615
R613
Q609
9V
NTSC VIDEO (μP)
IC601(2/2)
R609
R610
R611
C602
VIDEO IN/OUT (VTR)
CAMERA CONNECTOR
R958
D5V
R957
D962
C5
L4
Q969
VTR CONTROL

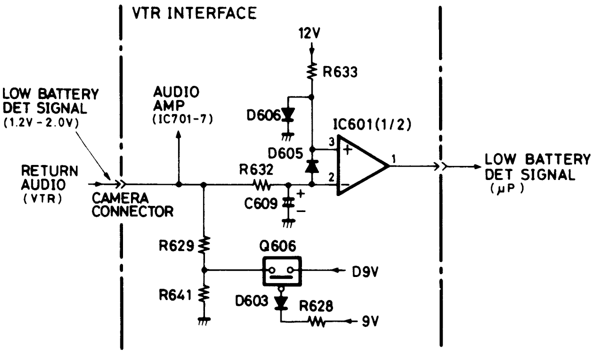
Fig. 1-7 Playback detection circuit

5. Low battery detection/power save output circuit (Fig. 1-8)

When the battery is full, no signal is applied through the filter circuit to the inverting input pin 2 from the VTR. The reference voltage at the noninverting input, pin 3, applied from the 12V source, is approx. 1.0V, therefore the output of the comparator IC601(1/2), pin 1, becomes a "Hi" voltage.

When the battery voltage becomes lower than the reference voltage of the detecting circuit in the VTR, it generates a 1.2V to 2.0V DC. This voltage is applied through the filter circuit to the inverting input, pin 2. As a result, IC601(1/2) generates a "Lo" voltage at pin 6 which is applied to the microprocessor circuit, therefore, low battery condition is detected and the "BATTERY LOW" graphics will be displayed in the EVF.

When the power save switch SW1004 is in the "PWR SAVE" position, the 9V B+ source applied to Q606 through R628 and D603 becomes 0V, this causes Q606 to turn "on". As a result, the 9V B+ source is applied through R629 to the VTR through the return audio in/power save out line of the camera connector, pin 5, to apply the power save control signal.



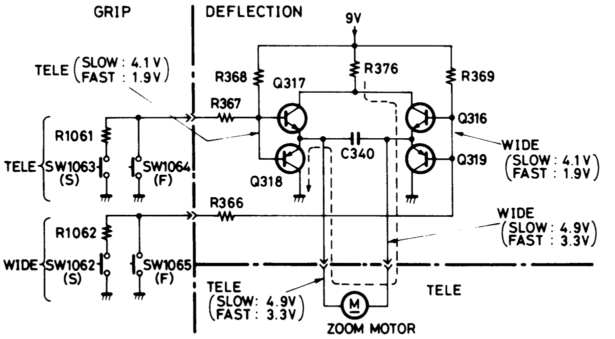
VTR INTERFACE
12V
R633
LOW BATTERY DET SIGNAL (1.2V - 2.0V)
AUDIO AMP (IC701-7)
D606
IC601(1/2)
D605
RETURN AUDIO (VTR)
R632
CAMERA CONNECTOR
C609
LOW BATTERY DET SIGNAL (μP)
R629
Q606
D9V
R641
D603
R628
9V

Fig. 1-8 Low battery detection/power save output circuit

6. Zoom motor control circuit (Fig. 1-9)

The zoom motor control circuit is composed of four transistors Q316 through Q319 on the deflection circuit board and four switches SW1062 through SW1065 on the grip circuit board. The zoom switches, tele SW1063 and SW1064 and wide SW1062 and SW1065, located on the handle grip are operated in two ways, the slow mode is entered when it is pressed lightly and the fast mode is entered when it is pressed futher.

When the tele switch is pressed lightly, R1061 is grounded by SW1063, causing the base bias voltage at Q318 to drop to approx. 4.1V. As a result, Q318 turns "on" and the motor drive current flows through Q316, zoom motor and Q318 to ground, causing the zoom motor to rotate the lens in the telephoto direction. When the tele switch is pressed futher, R367 is grounded by SW1064, causing the base bias voltage at Q318 to drop futher to approx. 1.9V. As a result, the conductivity of Q318 is increased, thereby increasing the motor drive current and increasing the speed of the zoom motor.

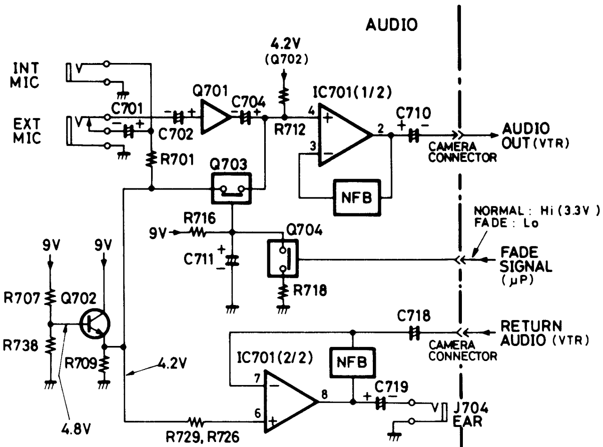


GRIP
DEFLECTION
9V
TELE (SLOW : 4.1V FAST : 1.9V)
R368
R376
R369
Q317
R367
Q316
R1061
C340
WIDE (SLOW : 4.1V FAST : 1.9V)
TELE
SW1063 (S)
SW1064 (F)
Q318
Q319
R366
WIDE (SLOW : 4.9V FAST : 3.3V)
R1062
WIDE
SW1062 (S)
SW1065 (F)
TELE (SLOW: 4.9V FAST: 3.3V)
TELE
M
ZOOM MOTOR

Fig. 1-9 Zoom motor control circuit

7. Audio/earphone amplifier circuit (Fig. 1-10)

The audio signal picked up by the internal microphone is routed through the external microphone jack and applied to the amplifier Q701. The amplified audio signal is then applied to the noninverting input, pin 4, of the operational amplifier IC701. The amplified signal leaves the IC via pin 2 and is applied through the audio out line of the camera connector to the VTR. Overall amplification is approximately 45 dB and a −20 dBm output is obtained when a microphone with a sensitivity −65 dBm is used. The microphone B+ source is developed by Q702 from the 9V source; it is approx. 4.2V.



AUDIO
4.2V (Q702)
INT MIC
EXT MIC
Q701
C704
IC701(1/2)
C701
C702
R712
C710
AUDIO OUT (VTR)
CAMERA CONNECTOR
R701
Q703
NFB
NORMAL : Hi (3.3V) FADE : Lo
R716
9V
Q704
9V
9V
C711
FADE SIGNAL (μP)
R718
R707
Q702
C718
RETURN AUDIO (VTR)
CAMERA CONNECTOR
R738
R709
4.2V
IC701(2/2)
NFB
C719
J704 EAR
4.8V
R729, R726

Fig. 1-10 Audio amplifier circuit

During normal operation, "Hi" voltage, approx. 3.3V, is applied to the base of Q704 from the fade signal generator circuit in the microprocessor circuit. This causes Q704 to turn "on", therefore, the voltage at the base of Q703 becomes "Lo" (approx. 2.6V) and Q703 turns "off". As a result, the operational amplifier IC701 amplifies the input audio signal by applying the bias current to the noninverting input, pin 4, from the 4.2V source. However, increasing voltage ("Lo" to "Hi"; fade in) or decreasing voltage ("Hi" to "Lo"; fade out) is applied to the base of Q704, causing Q704 to turn "off". This turns Q703 "on", therefore, the bias current of the operational amplifier IC701 flows to the 4.2V source line through Q703. As a result, the gain of the operational amplifier IC701 decreases and the output audio signal also decreases.

During VTR playback, the return audio signal from the VTR is applied through the return audio in line of the camera connector to the inverting input, pin 7, of the operational amplifier IC701. The amplified audio signal leaves the IC via pin 8 and is applied to the earphone jack J704 to monitor the sound.

8. Fade control circuit (Fig. 1-11)

The scene gradually appears (Fade in) and slowly disappears (Fade out) by pressing the fade switch SW1052. Sound also fades in and out with the picture. The microprocessor outputs 2 signals, fade control and fade delay, to perform the fade operation when the microprocessor IC801 identifies that the fade switch SW1052 is pressed and then the VTR trigger switch SW1061 is pressed. When the fade switch SW1052 is pressed, R953 is grounded through SW1052, causing the switching Q955 to turn "on", therefore, signal C3 of the key matrix scan signals is applied through D951 to pin 44 of IC801. Likewise, when the VTR trigger switch SW1061 is pressed, signal C4 is applied though D951 to pin 44 by turning Q951 "on".

8-1. Fade in operation

The fade mode is detected during the record/pause mode; IC801 generates a "Lo" voltage fade control signal from pin 18 and "Lo" voltage fade delay signal from pin 19. These 2 "Lo" voltage signals are applied to the fade signal generator circuit composed of Q887 through Q894, causing Q891 through Q894 to turn "off", therefore, "Lo" voltage is applied to pin 1 of the prevideo processing IC101. As a result, the prevideo output signal disappears. After approx. 2 seconds, the VTR mode changes to record from record/pause. At the same time, the fade delay signal changes to "Hi" from "Lo" voltage. This "Hi" voltage signal from pin 19 is applied through R897 to C886, so the charging current flows to ground through C886. This causes the input voltage of Q891 to increase continuously, thus causing the output voltage of Q892 to increase slowly. Therefore, the prevideo output signal gradually appears. The fade signal becomes "Hi" voltage after approx. 6 seconds, so the video output signal is set to the normal level.

The fade signal from Q892 is also applied to the base of Q704 of the audio amplifier circuit. When the "Lo" voltage is applied, Q704 turns "off", causing Q703 to turn "on". As a result, the bias current applied to the input of the audio amplifier IC701 flows to the 4.2V source line through Q703, therefore, the audio signal is not generated. After approx. 2 seconds, the voltage at the base of Q704 rises, causing the voltage at the base of Q703 to decrease continuously. This causes the bias current of the audio amplifier to increase slowly, therefore, the audio signal increases slowly.

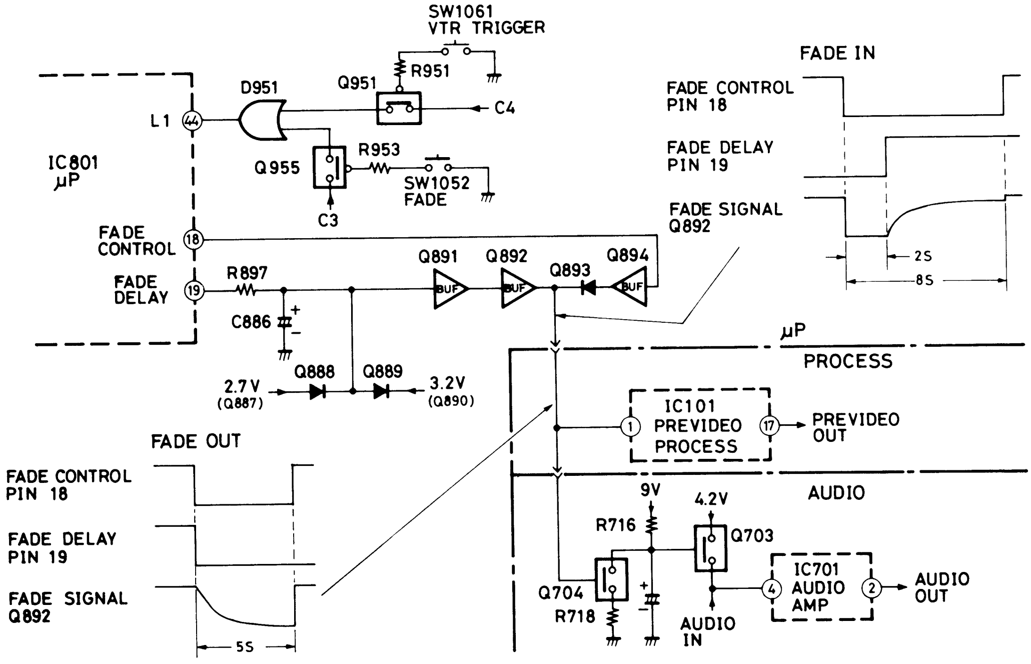

SW1061
VTR TRIGGER
R951
D951
Q951
C4
L1
44
IC801
µP
Q955
R953
SW1052
FADE
C3
FADE CONTROL
18
FADE DELAY
19
R897
C886
Q891
Q892
Q893
Q894
BUF
Q888
Q889
2.7V
(Q887)
3.2V
(Q890)
FADE IN
FADE CONTROL PIN 18
FADE DELAY PIN 19
FADE SIGNAL Q892
2S
8S
µP
PROCESS
IC101
PREVIDEO PROCESS
1
17
PREVIDEO OUT
AUDIO
9V
4.2V
R716
Q703
Q704
R718
IC701
AUDIO AMP
4
2
AUDIO OUT
AUDIO IN
FADE OUT
FADE CONTROL PIN 18
FADE DELAY PIN 19
FADE SIGNAL Q892
5S

Fig. 1-11 Fade control circuit

8-2. Fade out operation

IC801 generates a "Lo" voltage fade control signal via pin 18 and "Lo" voltage fade signal via pin 19 by detecting the fade out mode. These two signals are applied to the fade signal generator circuit which generates a decreasing fade signal. This decreasing fade signal is applied to pin 1 of IC101, causing the prevideo output signal to decrease continuously. As a result, the video output signal gradually disappears. The decreasing fade signal is also applied to the base of Q704, causing Q704 to turn "off" slowly, thus turning Q703 "on" slowly, because the base bias voltage of Q703 rises. As a result, the audio output signal decreases slowly.

9. VTR remote control circuit (Fig. 1-12)

When the VTR remote control switch is pressed, the corresponding ladder resistor R1042 through R1047 is grounded. The output impedance at the remote line of the camera connector is changed by pressing the VTR remote control switch, which is applied to the VTR. The mode control circuit of the VTR detects the value of the impedance, therefore, the VTR modes can be remotely controlled from the camera.

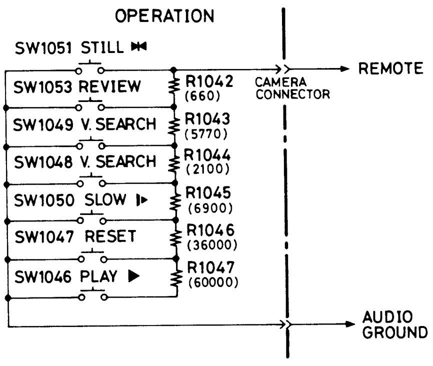

OPERATION
SW1051 STILL ⧓
SW1053 REVIEW
SW1049 V. SEARCH
SW1048 V. SEARCH
SW1050 SLOW ▶
SW1047 RESET
SW1046 PLAY ▶
R1042 (660)
R1043 (5770)
R1044 (2100)
R1045 (6900)
R1046 (36000)
R1047 (60000)
CAMERA CONNECTOR
REMOTE
AUDIO GROUND

Fig. 1-12 VTR remote control circuit

10. Auto focus control circuit (Fig. 1-13)

The D9V B+ source is always applied to the emitter of Q320. When the power save switch is in the "NORM" position, the 9V B+ source becomes 9V, causes Q321 to turn "off". Under this condition, the auto focus switch located on the lens block or remote control unit is pressed, R380 is grounded through D307. As a result, the auto focus B+ source is applied to the auto focus circuits in the lens block by turning Q320 "on". When the power save mode is entered by placing the power save switch in the "PWR SAVE" position, the 9V B+ source becomes 0V, causing Q321 to turn "on", therefore, Q320 keeps turning "off" if the auto focus switch is pressed. When the far switch located on the remote control unit is pressed with the auto/manual focus switch in the "MAN" position, R380 and far detect input of the auto focus circuits are grounded through D308, causing Q320 to turn "on". As a result, auto focus can be adjusted in the far direction while pressing the far switch. The near operation is the same as the far operation.

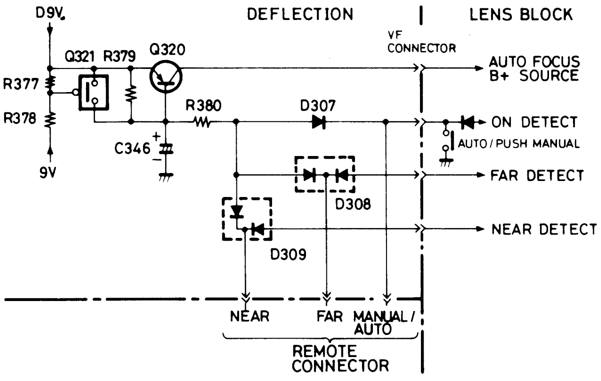

D9V
DEFLECTION
LENS BLOCK
VF CONNECTOR
Q321
R379
Q320
R377
R378
9V
R380
C346
D307
D308
D309
AUTO FOCUS B+ SOURCE
ON DETECT
AUTO / PUSH MANUAL
FAR DETECT
NEAR DETECT
NEAR
FAR
MANUAL / AUTO
REMOTE CONNECTOR

Fig. 1-13 Auto focus control circuit

SATICON DEFLECTION CIRCUITS

1. Horizontal saw/para signal generator and deflection circuit (Fig. 2-1)

The CP2 signal from IC251, pin 22, is applied to the switching Q303 which is connected between pins 2 and 3 of the sawtooth signal generator IC301(1/2). When the "Lo" period of the CP2 signal is applied to Q303, Q303 turns "off", causing the charging current to flow to the ramp capacitor C315. The input at the inverting input of IC301 (1/2) is decreased by C315, therefore, the output at pin 2 rises. When the "Hi" period of CP2 signal is applied to Q303, Q303 turns "on", causing the charging current of C315 to discharge via Q303. As a result, the input voltage at the inverting input, pin 3, becomes "Hi", therefore, the output voltage at pin 2 becomes "Lo" from "Hi". At the end of the "Hi" period of the CP2 signal, the ramp capacitor C315 begins charging again. Therefore, the horizontal sawtooth signal is generated via pin 2. This sawtooth signal is applied through C318 to the inverting input, pin 7, of the horizontal parabolic signal generator IC301(2/2). The output signal at pin 8 is fedback to the inverting input, pin 7, via C321 whose value is chosen to correctly integrate the sawtooth input signal. Therefore, a horizontal parabolic signal is generated at pin 8.

The horizontal sawtooth signal is applied through C323 and horizontal linear control RV303 to the noninverting input, pin 4, of the deflection amplifier IC303(1/2). The horizontal linear control RV303 controls the bias current at the noninverting input, therefore, the linearity of the sawtooth signal is controlled. When a stepped up flyback pulse is generated at pin 4 of the flyback transformer T301, a DC current flows through the horizontal wide control LV301 to the deflection yoke. At this time, the output at pin 2 of the deflection amplifier IC303(1/2) becomes "Lo" voltage, therefore, the current flowing through the deflection yoke enters the IC303(1/2) via pin 2.

During the "Lo" period of the flyback pulse, the sawtooth current flows to the deflection yoke. This current flowing through the deflection yoke flows to the flyback transformer T301, pin 4, through the horizontal wide control LV301. The horizontal parabolic signal is also applied to the inverting input, pin 3, of IC303(1/2) and a output sawtooth signal is fedback to the inverting input to correct the linearity. The horizontal center control RV304 is connected to pin 3, which controls the DC component of the sawtooth current, therefore, the centering of the deflection current is controlled.

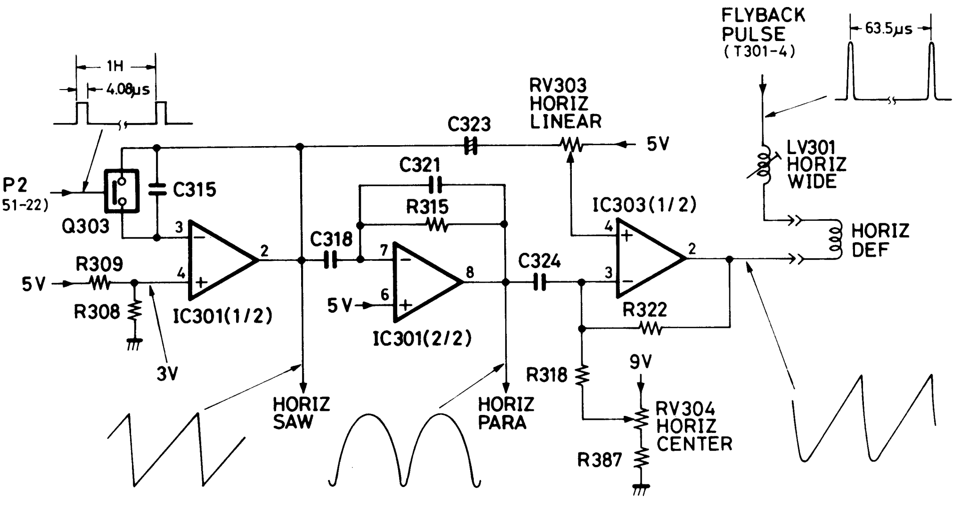


Fig. 2-1 Horizontal saw/para signal generator and deflection circuit

2. Vertical saw/para signal generator and deflection circuit (Fig. 2-2)

The VP signal from IC251, pin 19, is applied to the base of the switching Q304. The vertical sawtooth signal is generated by the sawtooth signal generator composed of IC302 (1/2), Q304 and C317 in the same way as the horizontal sawtooth signal. The vertical sawtooth signal is applied through C320 to the parabolic signal generator IC302(2/2) which generates a vertical parabolic signal in the same way as the horizontal parabolic signal.

The vertical sawtooth signal is applied through R323 and the vertical height control RV305 to the noninverting input, pin 6, of the vertical deflection amplifier IC302(2/2). The vertical height control RV305 controls the bias current at the noninverting input, therefore, the height of the sawtooth deflection current is controlled. The output sawtooth deflection current flows through the vertical deflection yoke. When the "Lo" period of the sawtooth signal is generated via pin 8, a reverse current flows through the vertical deflection yoke to IC303(2/2) from the 5V source. The vertical center control RV306 is connected to pin 7, which controls the voltage at the inverting input, therefore, vertical centering is controlled.

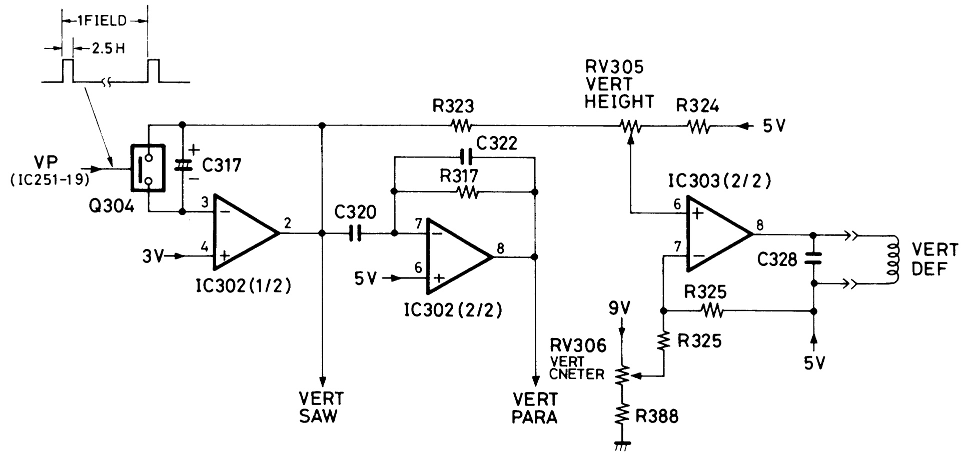

1FIELD
2.5H
VP
(IC251-19)
Q304
C317
3V
IC302(1/2)
C320
R323
C322
R317
5V
IC302(2/2)
VERT SAW
VERT PARA
RV305 VERT HEIGHT
R324
5V
IC303(2/2)
C328
VERT DEF
R325
9V
RV306 VERT CNETER
R325
R388
5V

Fig. 2-2 Vertical saw/para signal generator and deflection circuit

3. Saticon blanking circuit (Fig. 2-3)

It is necessary to blank the Saticon tube during the horizontal and vertical retrace periods to prevent extraneous signals from being generated as the beam is retraced.
Blanking is accomplished by application of the VP and WHD signals from IC251 and flyback pulse from Q302. When the VP signal is applied to Q325, it causes Q325 to turn "on", therefore, a "Hi" voltage pulse is applied through D304 to Q307. The WHD signal is applied through D304 to Q307. The flyback pulse is applied through D312 to Q307. As Q307 is a switching transistor, either pulse causes Q307 to turn "on". As Q307 turns "on", a "Hi" voltage is applied to the base of Q308 turning it "off", allowing the emitter voltage of Q308 to rise thus blanking the Saticon. At this time, Q309 turns "off" by the rising of the emitter voltage of Q308, therefore "Hi" voltage is applied to the AIC circuit.

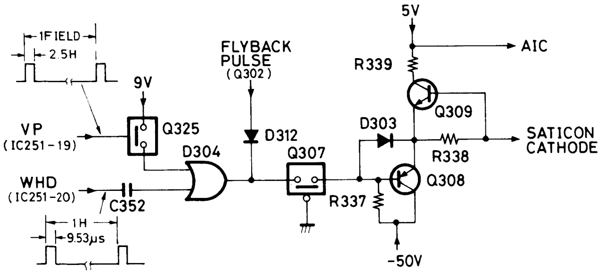

1FIELD
2.5H
9V
VP
(IC251-19)
Q325
D304
WHD
(IC251-20)
C352
1H
9.53μs
FLYBACK PULSE (Q302)
D312
Q307
5V
R339
AIC
Q309
D303
SATICON CATHODE
R338
Q308
R337
-50V

Fig. 2-3 Saticon blanking circuit

4. Bias light circuit (Fig. 2-4)

The pickup tube produces dark current when the light is blocked. The dark current of a saticon is extremely low. Therefore, when the camera is aimed at a dark scene, the potential at the photoconductive layer (target) becomes low. As a result, the beam does not respond to the variations of incoming light and lag increases. In order to minimize the lag, a bias light LED assembly is used to increase the light intensity on the Saticon.
The bias light control RV325 is responsible for controlling the bias light voltage.

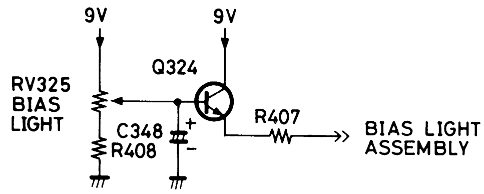

9V
9V
Q324
RV325 BIAS LIGHT
C348
R408
R407
BIAS LIGHT ASSEMBLY

Fig. 2-4 Bias light circuit

5. Automatic beam optimizer circuit (Fig. 2-5)

The automatic beam optimizer (ABO) circuit on the deflection circuit board controls the beam of the Saticon so that it always matches the object. The prevideo signal from the prevideo processing IC101, pin 6, on the process circuit board is amplified via the amplifier Q306, and it is superimposed over the beam control voltage from Q305 through D311 to improve the lack of the beam in highlight sections. The prevideo signal level superimposed over the beam control voltage is controlled to prevent the beam amount from increasing abnormally. The ABO control RV326 is responsible for controlling the base bias voltage of Q326, causing the conductance of Q326 to change, therefore, the amplified prevideo signal level is controlled.

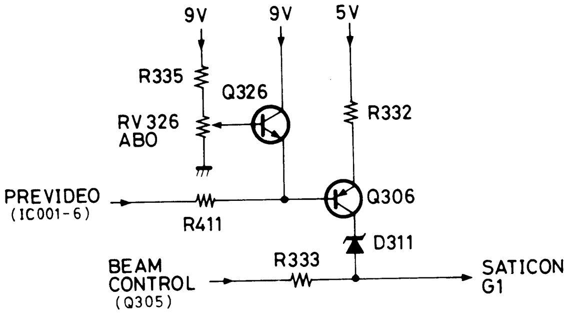

9V
9V
5V
R335
Q326
RV326
ABO
R332
PREVIDEO
(IC001-6)
R411
Q306
D311
BEAM
CONTROL
(Q305)
R333
SATICON
G1

Fig. 2-5 Automatic beam optimizer circuit

6. Dynamic focus correction circuit (Fig. 2-6)

The Saticon scanning electron beam is focused by application of a DC voltage to the focus grid. This correctly focuses the beam in the center of the target, but because of the increased beam distance from the cathode at the edges of the target surface, the electron beam becomes out of focus as it scans these areas of the target surface. This out of focus condition causes red and blue carriers to appear in the signal where they should not occur. These extraneous color carrier signals, when processed by the signal processing circuits, cause erroneous partial cancellation of the red and blue signals decreasing their amplitude. As a result, these areas of the picture become green because of the lack of red and blue data.

Undesirable distortion can be corrected by modulating the focus voltage with horizontal and vertical rate sawtooth and parabolic signals. The horizontal and vertical sawtooth and parabolic signals from the horizontal and vertical deflection circuits are applied to the tap of the four potentiometers in RVM1. When the controls are at their center positions, an equal amount of the appropriate signal is applied to the base of both transistors Q310 and Q311, which operate as an operational amplifier. In this case, no correction signal is output because an equal quantity of each signal is applied. However, as each control is rotated from its center position toward the base of Q310, the noninverting input, or to the base of Q311, the inverting input, the appropriate signal is then present in the output. This correction signal is coupled via C308 to Saticon focus grid G4.

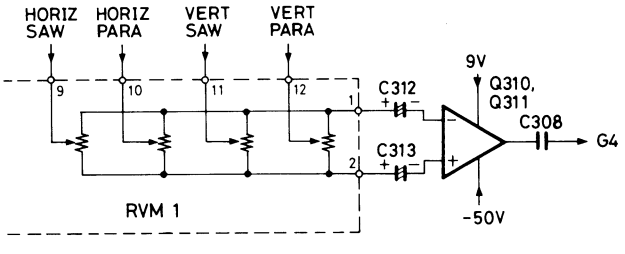

HORIZ SAW
HORIZ PARA
VERT SAW
VERT PARA
9
10
11
12
1
2
C312
C313
9V
Q310,
Q311
C308
G4
RVM 1
-50V

Fig. 2-6 Dynamic focus correction circuit

7. High voltage circuit (Fig. 2-7)

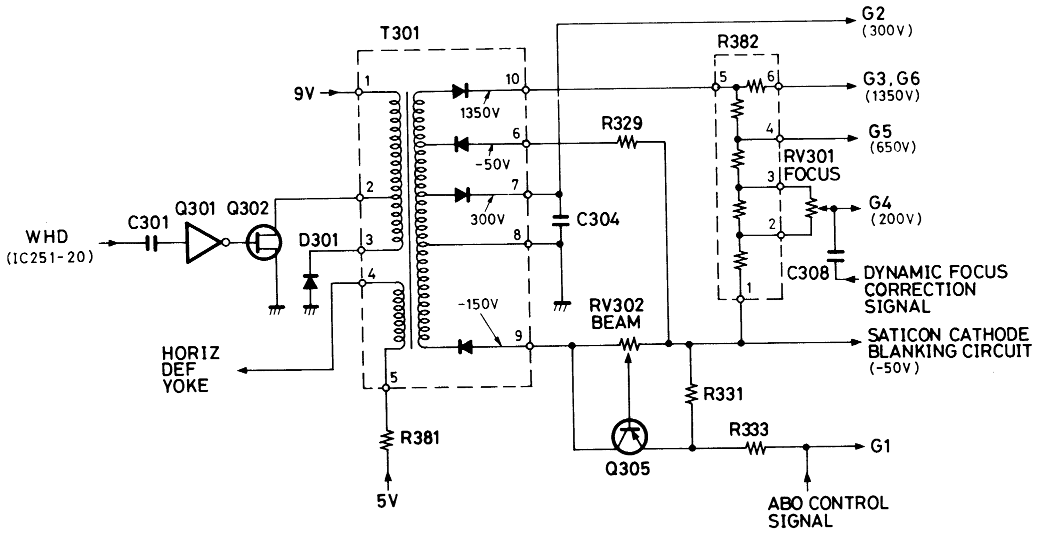

T301
9V
1
10
1350V
6
-50V
2
7
300V
8
3
4
-150V
9
5
WHD
(IC251-20)
C301
Q301
Q302
D301
HORIZ
DEF
YOKE
R381
5V
C304
R329
RV302
BEAM
Q305
R331
R333
G1
ABO CONTROL
SIGNAL
R382
G2
(300V)
G3,G6
(1350V)
G5
(650V)
RV301
FOCUS
G4
(200V)
C308
DYNAMIC FOCUS
CORRECTION
SIGNAL
SATICON CATHODE
BLANKING CIRCUIT
(-50V)

Fig. 2-7 High voltage circuit

The WHD signal from the sync generator IC251 is inverted via inverter Q301 and then applied to the driver Q302 to generate a flyback pulse. The high voltage power supply pack T301 contains a step-up transformer and several rectifiers to generate various DC output voltages to power the Saticon. Pin 10 supplies approx. 1350V which is applied through the resistor divider network R382 to grids 3 and 6 of the Saticon. Pin 6 supplies approx. −50V which is applied to the Saticon cathode blanking circuit and is also applied to the resistor divider network R382. R382 divides down to three voltages from the 1350V and −50V voltages applied from T301. One of these three voltages supplies approx. 650V which is applied to the grid G5 of the Saticon. The other two voltages are applied to the focus control RV301 which generates a focus voltage applied to the focus grid G4 of the Saticon (approx. 200V). The dynamic focus correctin signal is coupled to this focus voltage to control the focus around the edge of the target. Pin 7 supplies approx. 300V which is applied to grid 2 of the Saticon. Pin 9 supplies approx. −150V which is applied through the beam control circuit to grid 1 of the Saticon. Pin 4 supplies a stepped up flyback pulse which is applied to the horizontal deflection yoke.

SIGNAL PROCESSING CIRCUITS

1. Preamplifier circuit (Fig. 3-1)

Light falling upon the target surface of the Saticon tube generates a current that flows in the target circuit. This target current is applied via the percival coil of the preamplifier circuit to the gate of FET Q502. The video signal from Q502 is then applied to preamplifier Q503 through Q506. The prevideo signal is applied to the prevideo signal processing circuit. A portion of the prevideo signal is also applied to gate of Q502 to provide stabilization and frequency response characteristics of the prevideo signal. The percival coil connected between the target electrode and the gate of the FET serves to improve the noise response characteristics of the entire system. As the frequency of the video signal increases, the noise component tends to increase dramatically. The percival coil resonates with the Saticon output capacity at higher video frequencies to improve the video signal-to-noise ratio.

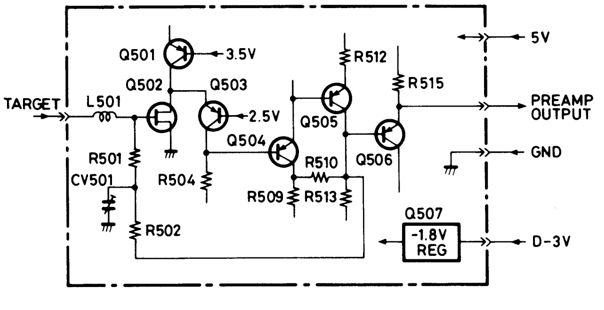


Fig. 3-1 Preamplifier circuit

2. Prevideo processing circuit (Fig. 3-2)

The prevideo signal from the preamplifier circuit is applied to the prevideo processing circuits in IC1. The prevideo signal is first clamped by the CP1 from the pulse separator circuit and is then blanked and clipped by the WHD pulse from the pulse separator. This prevideo signal must have its optical black reference level corrected and be dark shading corrected before being amplified by the AGC amplifier. The video signal picked up from the target surface does not have correct optical black response, causing the black level of the video signal to be modulated. These variations in the black level are corrected by adding vertical rate sawtooth and parabolic correction signals to the prevideo signal. Due to uncontrollable variations in the construction of the Saticon tube, it is possible that the dark current generated by the beam striking the target surface may vary as the beam is scanned horizontally across the target surface. These variations in the dark current are corrected by adding horizontal rate sawtooth and parabolic correction signals to the prevideo signal. These vertical and horizontal rate sawtooth and parabolic signals are applied to the taps of the four potentiometers on the deflection circuit board. When the controls are at their center positions, an equal amount of appropriate signal is applied to the noninverting input and to the inverting input of the optical black correction circuit in IC1. In this case, no correction signal is generated. However, as the tap of the control rotated, the vertical or horizontal rate sawtooth or parabolic signal appears at the output either inverted or noninverted as determined by the direction of rotation. The composite correction signal is then added to the prevideo signal, thereby optical black level and dark shading are corrected. The DC offset of this output voltage is adjusted by the Y pulse cancel control RV1.

The optical black level and dark shading corrected prevideo signal is then applied through the gain control amplifier which applies gamma correction and compensates the DC offset, to the AGC amplifier. The output level of the AGC amplifier is detected by the AGC detector and is applied to the AGC amplifier. The output voltage of the AGC detector is output via pin 16, and made constant by capacitor C6. The AGC amplifier is controlled by this filtered voltage. The AGC gain control RV2 is connected between pin 16 and 5V B+ source, therefore, the AGC amplifier is also controlled by this AGC gain control RV2. The gain controlled prevideo signal from the AGC amplifier leaves the IC via 17 through the fade control circuit which generates an increasing or decreasing signal depending on the fade signal applied from the fade signal generator circuit Q892 on the microprocessor circuit board. The signal output from pin 17 is applied to the luminance processing circuit and chrominance signal processing circuit.

The optical black level and dark shading corrected prevideo signal is also applied to the buffer amplifier. The 3.58 MHz chroma subcarrier signals are removed from the buffered prevideo signals by the 3.58 MHz subcarrier trap circuit composed of L1 and C3 which is connected to pin 7. The Y signal without a 3.58 MHz subcarrier signal leaves the IC via pin 8 through the buffer amplifier and is then applied to the tracking signal generator in IC2 and to the NTSC video processing circuit. This Y signal is also applied to the auto iris control (AIC) circuit on the deflection circuit board. The buffered Y signal with corrected gamma leaves the IC via pin 6 through the amplifier and is then applied to the automatic beam optimizer circuit Q306 on the deflection circuit board.

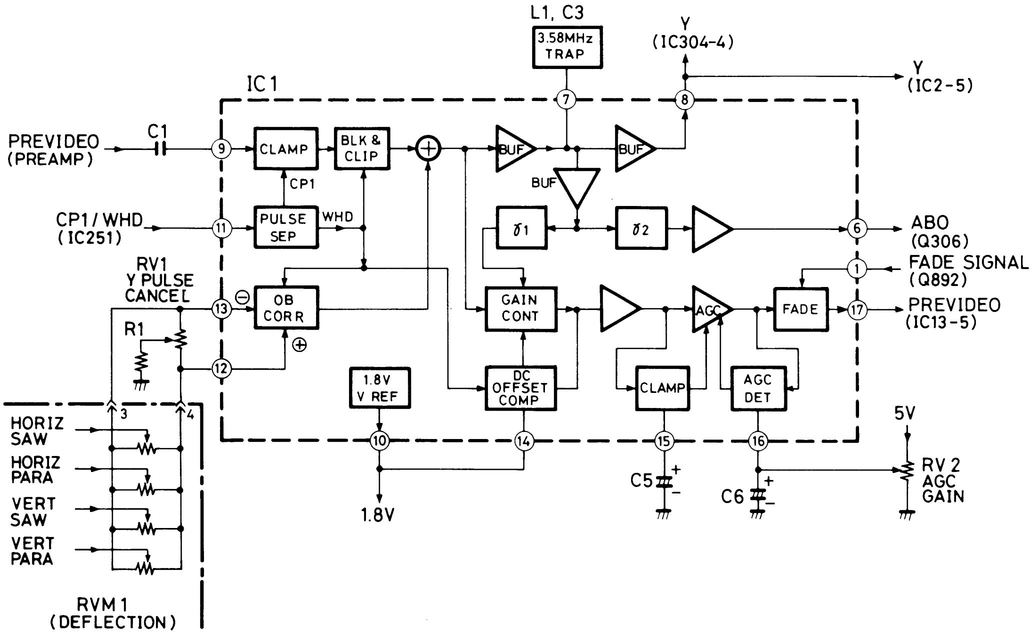


Fig. 3-2 Prevideo processing circuit

3. AIC circuit (Fig. 3-3)

The Y signal from the prevideo processing IC1, pin 8, is applied to the noninverting input, pin 4, of the operational amplifier IC304. The reference voltage at the inverting input, pin 3, of this operational amplifier is applied from both of the divided voltage of approx. 1.3V and auto iris video level control RV324. If the Y signal decreased, as is the case when the average lighting of the scene shot by the camera decreases, IC304 generates dropped output voltage via pin 2, because the DC voltage corresponding to the level of the Y signal becomes lower than the reference voltage. The decreased voltage causes the voltage applied to the inverting input, pin 7, of IC304 through D313-2 from the 5V B+ source to decrease.

The reference voltage is 1.8V which is applied from the prevideo processing IC1, pin 10. IC304 generates an increasing voltage via pin 8, because the input voltage becomes lower than the reference voltage at the noninverting input, pin 6. This increased voltage is applied through D310 to the base of the motor driver Q322, causing the iris to open wider, because Q322 generates an increasing voltage. A feedback signal is generated by the control coil in the iris motor applied to both inputs of IC304, pins 6 and 7. The horizontal paralolic and vertical parabolic signal are added to the Y signal applied to the noninverting input of IC304, pin 4, to sample the Y signal at the center portion of the vertical and horizontal periods.

When the power is first applied to the camera, the emission from the Saticon cathode is very low until the filaments warm up. During this period, the output from the Saticon target is also very low, thus the signal to the luminance processing IC is low. The AIC circuit then causes the iris to open allowing more light to reach the target thus increasing the level of the Y signal. Under these conditions, pointing the camera at a very bright object could cause a spot to be burned on the Saticon target surface during filament warm up. To prevent spot burn, an iris shutdown circuit forces the AIC to close the iris until the filaments of the Saticon have time to sufficiently warm up to generate the correct Y signal. When power is first applied to the camera, the output of Q309 of the cathode blanking circuit is applied through D306 to the inverting input, pin 7, of IC304. At this time, the output of Q309 is "Hi", causing the output of IC304, pin 8, to become "Lo". This "Lo" voltage applied through D310 to Q322 causes Q322 to turn "off", therefore, the iris keeps closed. Then the sync generator IC251 generates pulses. When the VP, WHD or flyback pulse is applied to the cathode blanking circuit, the output of Q309 becomes "Lo", causing IC304 to operate normally.

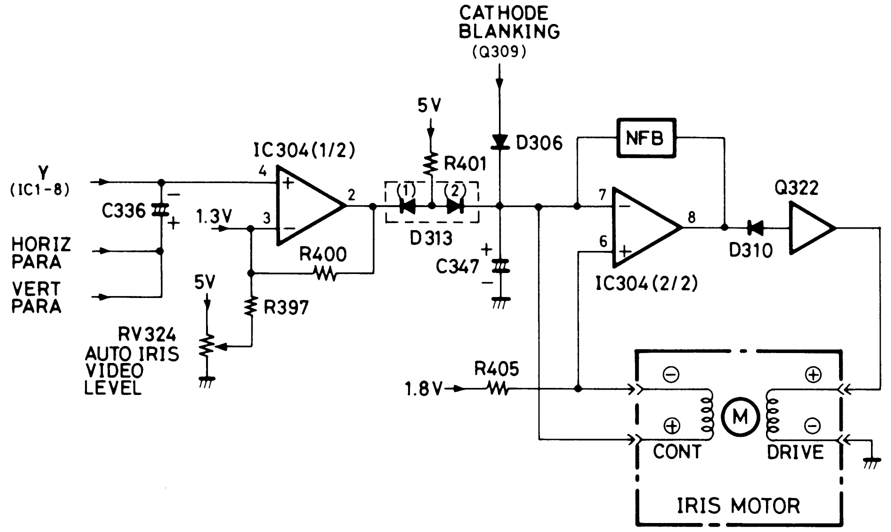


Fig. 3-3 AIC circuit

4. Luminance processing circuit (Fig. 3-4)

The signal from IC1, pin 17, is applied through pin 5 to the aperture circuit and clamp circuit in IC13. The aperture circuit composed with L4 and C97 which corrects deterioration of modulation at high frequencies of the pickup tube, and emphasizes the edge section for clarity. The aperture corrected signal leaves the IC via pin 1 and is then applied to the luminance processing IC2, pin 11. The signal is clamped to the 1.8V reference voltage applied from the prevideo processing IC1 by applying CP2 applied from the sync generator IC251 and it is applied to the vertical edge correction signal generator.

The aperture corrected signal is first clamped by applying CP1 from the pulse separator and is then blanked by applying WHD from the pulse separator. The output signal from the blanking circuit is applied to both the YH clip and YL clip circuits. The output of the YH clip circuit leaves the IC via pin 9 and is passed through the lowpass filter composed of DL2 and DL3 which traps out all luminance frequencies above 3.0 MHz. The YH signal containing luminance information below 3.0 MHz is then applied to the horizontal aperture circuit in IC3.

The output of the YL clip circuit leaves the IC via pin 7 and is passed through the lowpass filter DL6 which traps out all luminance frequencies above 700 kHz. The YL signal containing luminance information below 700 kHz is then applied to the chroma detectors in IC9 and IC10.

The Y signal from IC1, pin 8, is applied to the tracking signal generator in IC2. The tracking signal generator generates tracking signals 1 through 3 and outputs them to pins 15, 15 and 17, which are proportional to the white level of the video signal. Tracking signal 3 represents the lowlight areas of the video signal, tracking signal 2 represents the medium light areas of the video signal, and tracking signal 1 represents the highlight areas of the video signal. The three tracking signals are applied to the red/blue tracking controls RV10 through RV12 and RV14 through RV16. These signals are added to the red and blue signals to ensure that the red and blue signals track the luminance information correctly. The degamma reference control RV5 is responsible for adjusting the reference voltage level of the tracking signals.

The Y signal from pin 5 is also applied to the modulator circuit which generates an output signal corresponding to the average of the Y signal. The output of the modulator circuit is applied to the detector circuit and is then compared with the voltage at pin 3. When the average level of the Y signal is lower than the reference voltage which is controlled by the low light indicator set control RV323, "Lo" voltage low light signal leaves the IC via pin 6. This "Lo" voltage signal is applied to inverters and is inverted twice by Q314 and Q315. The resultant "Lo" voltage signal is then applied to the microprocessor circuit, therefore, the graphics "LOW LIGHT" will flash in the EVF.

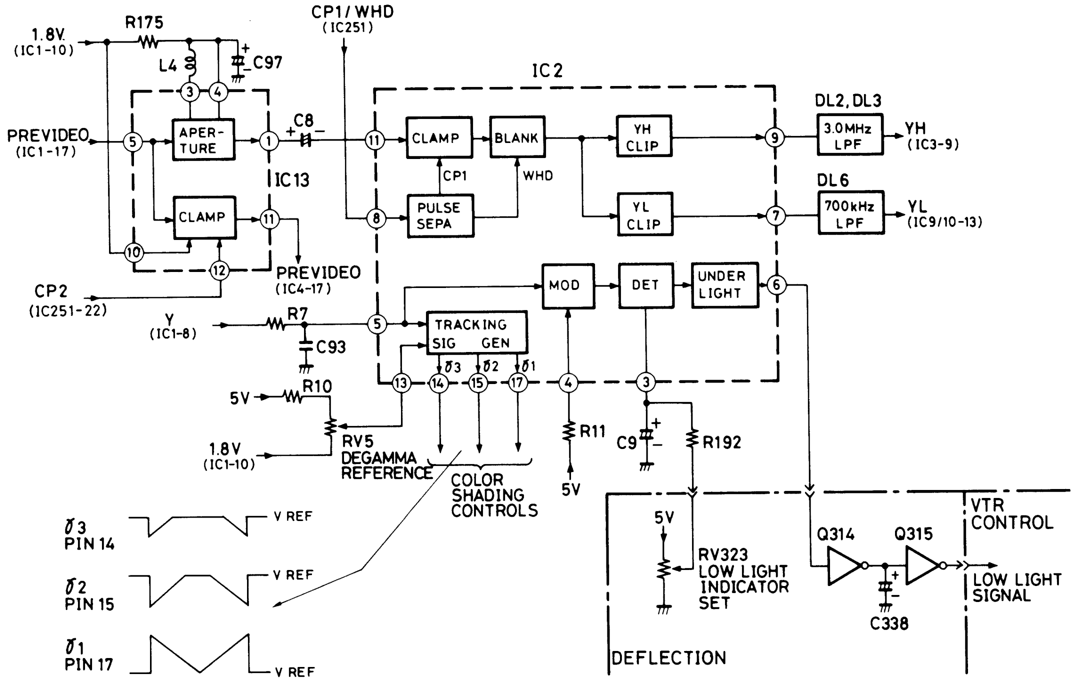

CP1/WHD
(IC251)
1.8V
(IC1-10)
R175
L4
C97
IC2
PREVIDEO
(IC1-17)
APER-TURE
C8
IC13
CLAMP
CLAMP
BLANK
YH CLIP
YL CLIP
CP1
WHD
PULSE SEPA
DL2, DL3
3.0MHz LPF
YH
(IC3-9)
DL6
700kHz LPF
YL
(IC9/10-13)
CP2
(IC251-22)
PREVIDEO
(IC4-17)
MOD
DET
UNDER LIGHT
Y
(IC1-8)
R7
C93
TRACKING SIG GEN
γ3
γ2
γ1
5V
R10
RV5
1.8V
(IC1-10)
DEGAMMA REFERENCE
COLOR SHADING CONTROLS
R11
5V
C9
R192
γ3
PIN 14
V REF
γ2
PIN 15
V REF
γ1
PIN 17
V REF
5V
RV323
LOW LIGHT INDICATOR SET
Q314
Q315
C338
VTR CONTROL
LOW LIGHT SIGNAL
DEFLECTION

Fig. 3-4 Luminance processing circuit

5. Vertical edge correction signal generator circuit (Fig. 3-4)

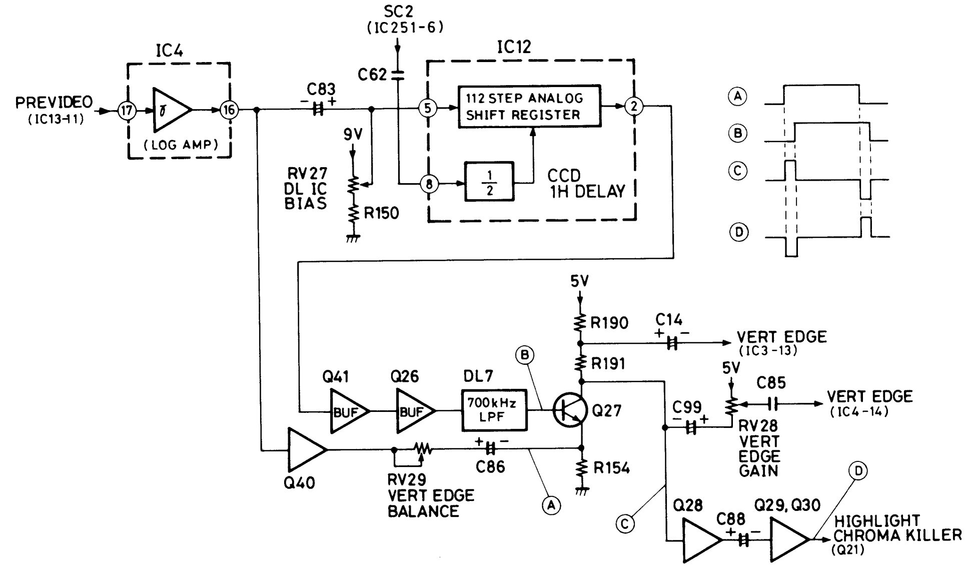

SC2
(IC251-6)
IC4
IC12
PREVIDEO
(IC13-11)
γ
(LOG AMP)
C62
C83
112 STEP ANALOG SHIFT REGISTER
9V
RV27
DL IC BIAS
R150
1/2
CCD 1H DELAY
Ⓐ
Ⓑ
Ⓒ
Ⓓ
5V
R190
C14
VERT EDGE
(IC3-13)
R191
5V
C85
VERT EDGE
(IC4-14)
Q41
Q26
DL7
BUF
BUF
700kHz LPF
Q27
C99
RV28
VERT EDGE GAIN
C86
R154
Q40
RV29
VERT EDGE BALANCE
Q28
Q29, Q30
C88
HIGHLIGHT CHROMA KILLER
(Q21)

Fig. 3-5 Vertical edge correction signal generator circuit

The signal from the clamp circuit in IC13 is applied to the gamma correction circuit in IC4, pin 17. The gamma corrected signal leaves the IC via pin 16, which is applied to the 112-step analog shift register in CCD 1H delay IC12, pin 5, and is also applied to one end of the vertical edge balance control RV29 through the amplifier Q40. The other input of IC12 is the SC2 from the sync generator IC251, pin 6. As a result, the output signal from pin 2 of IC12 is 1H (64 μs) delayed. The 1H delayed signal is then applied through buffer amplifieres Q41 and Q26 to the 700 kHz lowpass filter DL7. The lowpass filtered signal is the YL signal, which is applied to the base of subtractor Q27. The non-delayed signal from RV29 is also applied to the emitter of Q27. Q27 generates a subtracting signal (A − B = C) which is the vertical edge correction signal. The gain controlled vertical edge correction signal is then applied to the vertical edge correction circuit in IC4. This signal is applied to the video processing IC3 and to the amplifier Q28. The amplified vertical edge correction signal is applied through the inverter composed of Q29 and Q30 to the highlight chroma killer circuit.

6. Red/Blue separation circuit (Fig. 3-6)

The signal from IC1, pin 17, is applied to the 3.58 MHz bandpass filter DL1 which passes only the 3.58 MHz chroma subcarrier signal. The 3.58 MHz chroma subcarrier signal is applied through the chroma carrier gain control RV3 to the blanking circuit in IC1. This chroma subcarrier signal is blanked by WHD pulse from the pulse separator, is buffered, and then leaves the IC via pin 4 to the 1H delay line DL5 and to the phase shifter Q9. The 1H delayed chroma subcarrier signal is applied through the carrier balance control RV8 to the amplifier in IC4. The chroma subcarrier signal applied to the phase shifter Q9 is phase shifted by the action of Q9 and carrier phase control RV7. This phase shifted chroma subcarrier signal is then applied to the Rc/Bc separation circuit in IC4 through pin 11. The 1H delayed chroma subcarrier signal is first amplified and is then combined with the vertical edge correction signal from pin 14 to correct vertical edge color distortion. The vertical edge corrected chroma subcarrier signal is then applied through the amplifier to the Rc/Bc separator. The red signal is separated by adding the 1H delayed chroma subcarrier signal to the 90° phase shifted chroma subcarrier signal. The blue signal is separated by subtracting the 1H delayed chroma subcarrier signal from the 90° phase shifted chroma subcarrier signal. These separated red and blue signals are applied through the highpass filter amplifier to the tracking and shading correction circuits respectively. The color shading caused by the uneven modulation characteristics (slight geometric distortion in the filter and target, variations in the target sensitivity, etc) of the pick-up tube assembly. To eliminate this color shading, the color shading correction signals consisting of horizontal and vertical rate sawtooth and parabolic signals are added to the highpass filtered red and blue signals respectively. At the same time, the red and blue tracking signals are also added to the red and blue signals respectively.

The tracking and color shading corrected red and blue subcarrier signals leave the IC via pins 8 and 4 through the amplifier and are then applied to the red and blue gain control and detector circuit respectively.

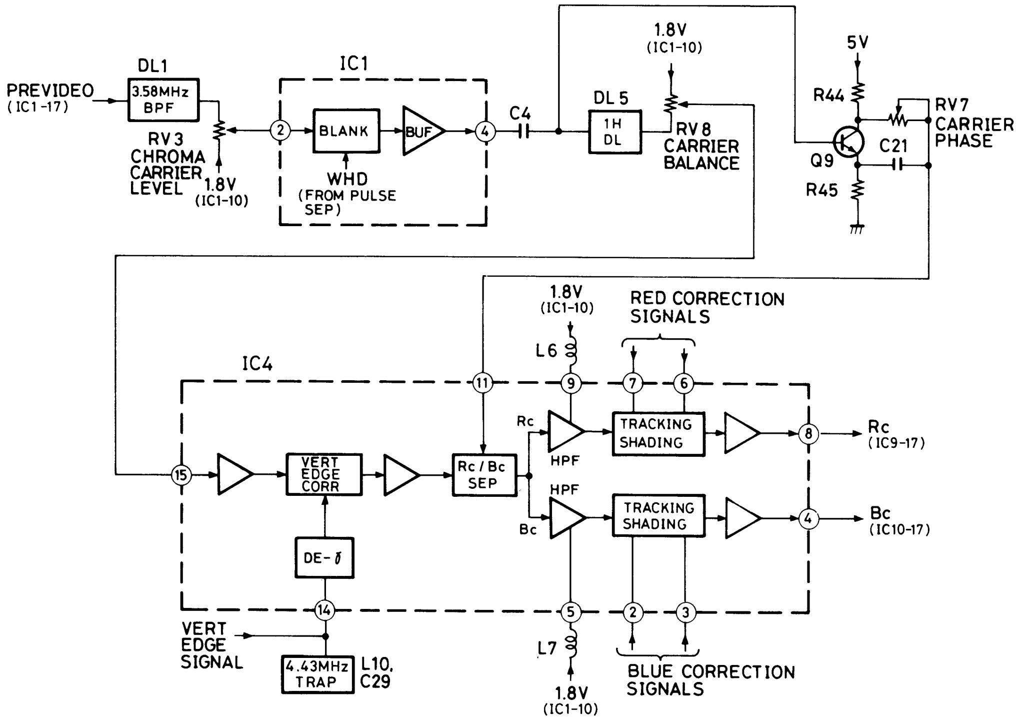

DL1
3.58MHz BPF
PREVIDEO (IC1-17)
RV3 CHROMA CARRIER LEVEL
1.8V (IC1-10)
IC1
2
BLANK
BUF
4
WHD (FROM PULSE SEP)
C4
1.8V (IC1-10)
DL 5
1H DL
RV8 CARRIER BALANCE
5V
R44
RV7 CARRIER PHASE
Q9
C21
R45
1.8V (IC1-10)
RED CORRECTION SIGNALS
L6
IC4
11
9
7
6
Rc
TRACKING SHADING
8
Rc (IC9-17)
15
VERT EDGE CORR
Rc / Bc SEP
HPF
HPF
Bc
TRACKING SHADING
4
Bc (IC10-17)
DE-γ
14
5
2
3
VERT EDGE SIGNAL
4.43MHz TRAP
L10, C29
L7
1.8V (IC1-10)
BLUE CORRECTION SIGNALS

Fig. 3-6 Red/Blue separation circuit

7. Red/Blue gain control and detector circuits (Fig. 3-7)

The red subcarrier signal from IC4, pin 8, is applied to the auto-white balance correction circuit which is a gain control circuit. The gain of the output signal from the AWB circuit is controlled by the DC voltage applied from the automatic white balance control circuit IC201, which is then applied to the red detector circuit. Here the red subcarrier signal is detected to generate the red color signal and then applied to the R-YL matrixing circuit. The YL signal from the low-pass filter DL6 is applied to the R-YL matrixing circuit through pin 13. The matrixing circuit generates a R-YL color difference signal which leaves the IC via pin 5 and is applied to the auto white balance control circuit IC201, pin 23, to generate the AWB red gain control DC voltage. The R-YL signal also leaves the IC via pin 12 and is applied through the 3.58 MHz subcarrier trap circuit composed of L15 and C101 to the buffer amplifier Q13. The buffered R-YL signal reenters the IC via pin 11 and is applied to the matrixing circuit. Finally, the matrixed R-YL signal which is matrixed with the R-YL signal and B-YL signal from IC10, pin 6, in conjunction with the R-YL clipped signal from the R-YL clip circuit in the encoder IC11, pin 1, leaves the IC via pin 7. The B-YL signal is generated in the same way as the R-YL signal, and is applied through the 700 kHz lowpass filter and buffer Q16 to the encoder IC11, pin 17.

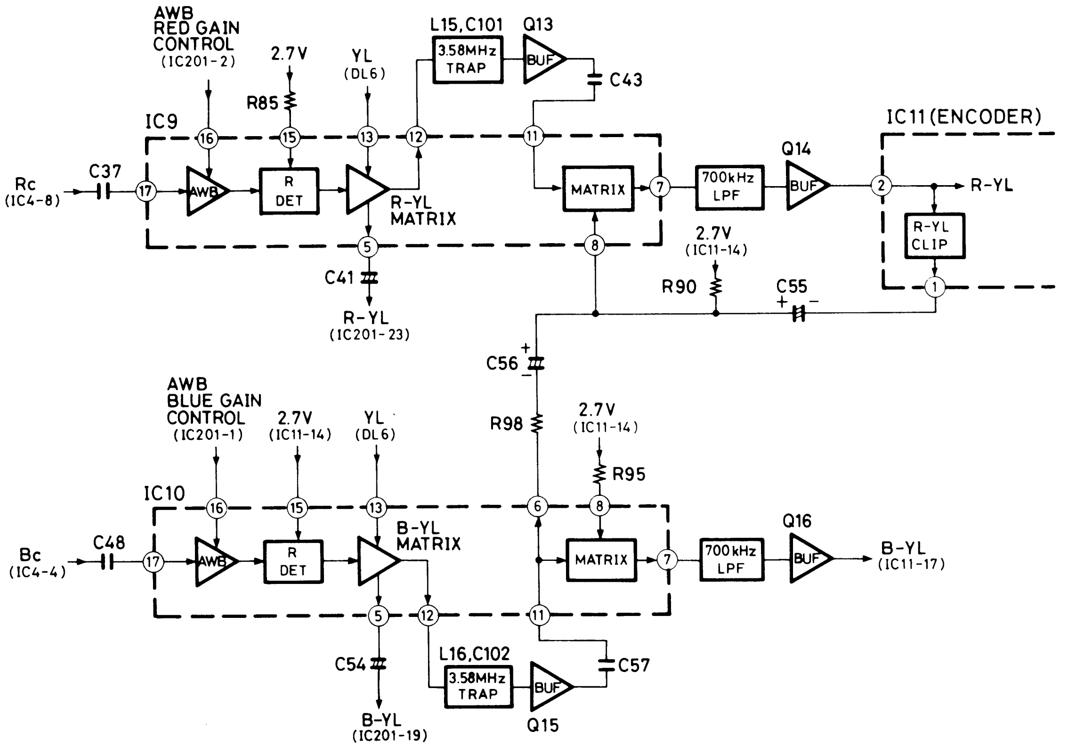

AWB
RED GAIN
CONTROL
(IC201-2)
2.7V
YL
(DL6)
L15,C101
3.58MHz TRAP
Q13
BUF
C43
R85
IC9
16
15
13
12
11
IC11(ENCODER)
Q14
Rc
(IC4-8)
C37
17
AWB
R DET
R-YL MATRIX
MATRIX
7
700kHz LPF
BUF
2
R-YL
R-YL CLIP
5
8
2.7V
(IC11-14)
C41
R90
C55
1
R-YL
(IC201-23)
C56
AWB
BLUE GAIN
CONTROL
(IC201-1)
2.7V
(IC11-14)
YL
(DL6)
R98
2.7V
(IC11-14)
R95
IC10
16
15
13
6
8
B-YL MATRIX
Q16
Bc
(IC4-4)
C48
17
AWB
R DET
MATRIX
7
700kHz LPF
BUF
B-YL
(IC11-17)
5
12
11
C54
L16,C102
3.58MHz TRAP
BUF
C57
B-YL
(IC201-19)
Q15

Fig. 3-7 Red/Blue gain control and detector circuits

8. Auto white balance control circuit (Figs. 3-8 and 3-9)

The auto white balance control circuit is responsible for controlling the gain of the red and blue chroma signal to maintain correct white balance (color temperature) of the video signal under various lighting conditions.

When the power is first applied, a reset pulse is generated and is applied through pin 13 to the reset control circuit in IC201, causing the preset gain control voltages to leave the IC via pins 1 and 2 and is then applied through the tracking circuit to the red and blue gain control circuit in IC9 and IC10 at approx. 2.5V. These preset gain control DC voltages control the mixing of the red and blue chroma signals so that 3200 K lighting the video output signal has correct white balance.

Under normal lighting conditions, the low light detector circuit generates a "Hi" voltage of approx. 3.5V to 4.5V, which is applied to pin 13 of the NOR gate IC202. As the other input, pin 12, is grounded, the output at pin 11 becomes a "Lo" voltage which is applied to pin 8 of the NOR gate IC202. Therefore, when the white switch SW1056 is placed in the "SET" position, the output at pin 10 becomes "Hi" voltage. This "Hi" voltage is applied to the start/stop control circuit in IC201 through pin 5, causing the auto white balance control circuit to start operation. However, when the white switch SW1056 is placed in the "SET" position with low lighting conditions, the auto white balance control circuit does not start operation because a "Lo" voltage is applied to pin 12 of IC202 from the low light detector circuit.

The color difference R-YL signal is applied to the clamp circuit in IC201 through pin 23, and it is clamped by CP2 from the sync generator IC251, pin 22. The clamped R-YL signal leaves the IC via pin 22 through the gate circuit which passes the signal while applying the "Lo" period of the C BLK signal applied from IC251, pin 18, and reenters the IC via pin 25 through the smoothing circuit. The DC voltage corresponding to the average of the R-YL signal is then applied to the inverting input of the comparator. The B-YL signal is processed in the same way as the R-YL signal and the DC voltage corresponding to the average of the B-YL signal is applied to the noninverting input of the comparator. At the same time, the charging voltage of C208 which is the clamp voltage leaves the IC via pin 20 through the gate circuit and is applied through the smoothing circuit to the noninverting input of the red comparator, pin 26, and to the inverting input of the blue comparator, pin 28, as a reference voltage. This voltage is the pedestal level of the color difference signals, B-YL and R-YL signals.

When the level of the R-YL signal is higher than the reference voltage, which means the red signal is more than the YL signal, the comparator generates a "Lo" voltage. The "Lo" voltage is applied to the up/down control circuit, causes the up/down control circuit to generate a down control signal which is applied to the up/down counter, thus causing the up/down counter to count down. As a result, the output of the D/A converter decreases in discrete voltage steps. The gain control DC voltage is applied through the tracking circuit to the red gain control circuit in IC9. The red signal decreased by applying the gain control DC voltage decreases and this causes the output of the comparator to go to "Hi" from "Lo" which means the red signal level and the YL signal level are equal. At this time, the up/down counter stops counting but repeats two steps. A similar action occurs for the blue comparator and up/down counter circuits. The correct white balance is obtained by these two actions within an approx. 3 seconds period, which means the red, blue and YL signal levels are nearly equal, thus holding the correct gain control DC voltages for the blue and red gains. When the correct white balance is obtained, "Hi" voltage is generated by the start/stop control circuit through pin 8. When the correct white balance is obtained, the gain control DC voltages are held and applied to the blue and red gain control circuits if the white switch SW1056 is changed to the "NORM" position. When the correct white balance is not obtained within 3 seconds of the auto white balance setting operation, the D/A converters keeping the highest or lowest voltages depending on the input level. At this time, the start/stop control circuit generates a "Lo" voltage which is applied to the microprocessor circuit, therefore, the graphics "WHITE BALANCE" will flash. The red white set control RV201 connected to pin 25 and blue white set control RV202 connected to pin 27 are responsible for adjusting the white balance.

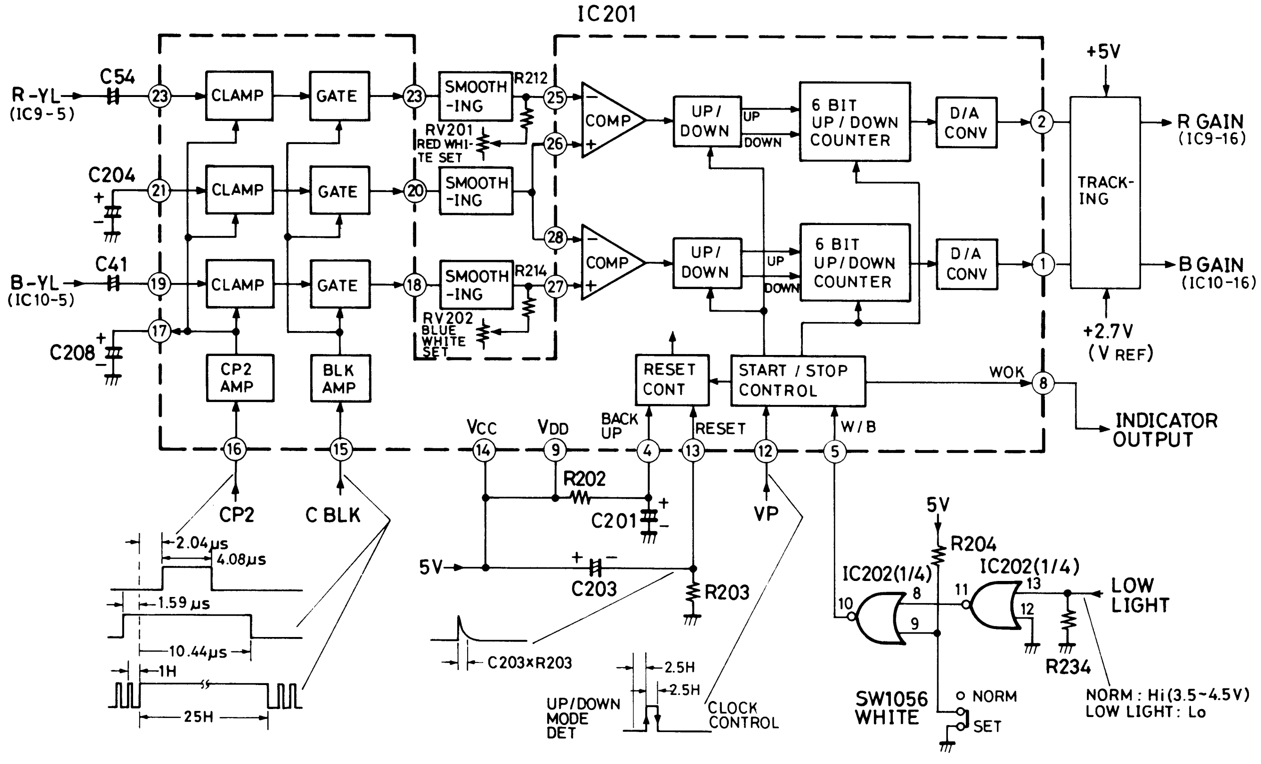

IC201
R-YL
(IC9-5)
C54
C204
C41
B-YL
(IC10-5)
C208
CLAMP
GATE
CLAMP
GATE
CLAMP
GATE
CP2 AMP
BLK AMP
SMOOTH -ING
SMOOTH -ING
SMOOTH -ING
R212
RV201 RED WHITE SET
R214
RV202 BLUE WHITE SET
COMP
COMP
UP/ DOWN
UP/ DOWN
UP
DOWN
6 BIT UP / DOWN COUNTER
6 BIT UP/DOWN COUNTER
D/A CONV
D/A CONV
+5V
TRACK-ING
R GAIN
(IC9-16)
B GAIN
(IC10-16)
+2.7V
(V REF)
RESET CONT
START / STOP CONTROL
WOK
INDICATOR OUTPUT
Vcc
VDD
BACK UP
RESET
W/B
CP2
C BLK
R202
C201
5V
C203
R203
VP
5V
R204
IC202(1/4)
IC202(1/4)
LOW LIGHT
R234
2.04µs
4.08µs
1.59 µs
10.44µs
1H
25H
C203×R203
2.5H
2.5H
UP/DOWN MODE DET
CLOCK CONTROL
SW1056 WHITE
NORM
SET
NORM : Hi(3.5~4.5V)
LOW LIGHT : Lo

Fig. 3-8 Auto white balance control circuit

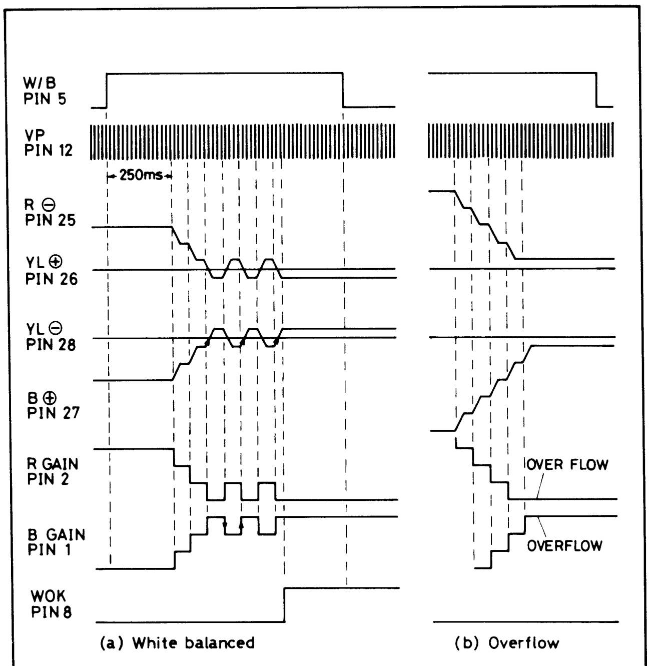


Fig. 3-9 AWB input/output signals

9. Chroma encoder circuit (Fig. 3-10)

The R-YL signal from Q14 is first fixed at the black level by the red setup control RV23 and is then applied to the R-YL balanced modulator along with the SC1 signal from pin 3. The modulated R-YL signal is applied to the gain control circuit which is controlled by the R-YL gain control RV24 connected to pin 4.

Likewise, the B-YL signal from Q16 is first fixed at the black level by the blue setup control RV22 and is then applied to the B-YL balanced modulator. The phase of SC2 signal from IC251, pin 7, is adjusted to a 90° phase shift by the B-YL subcarrier phase control CV1 connected to pin 16, and is then applied to the B-YL balanced modulator. The modulated B-YL signal is applied through the B-YL gain control circuit to the adder circuit. These two modulated signals are combined and it is applied to the chroma gain control circuit which reduces the chroma output amplitude in low brightness areas of the picture by applying the low chroma detector signal. This low brightness suppressed chroma signal is clamped by the CP from the pulse separator, and leaves the IC via pin 12.

Before applying the chroma signal to the amplifier circuit composed of Q22 and Q23, the vertical edge correction signal from Q29 and Q30 is added to the chroma signal to eliminate the vertical edge transition noise. In addition, the high luminance chroma suppression signal generated by Q19 through Q21 is added to the chroma signal to eliminate the high luminance chroma signal. When used under fluorescent or other high brightness lighting, color can be developed in the high brightness portions of the chroma signal. To prevent the developing of color in the chroma signal, the high luminance chroma suppression circuit operates if the Y signal level is more than the reference level. The Y signal from the prevideo processing

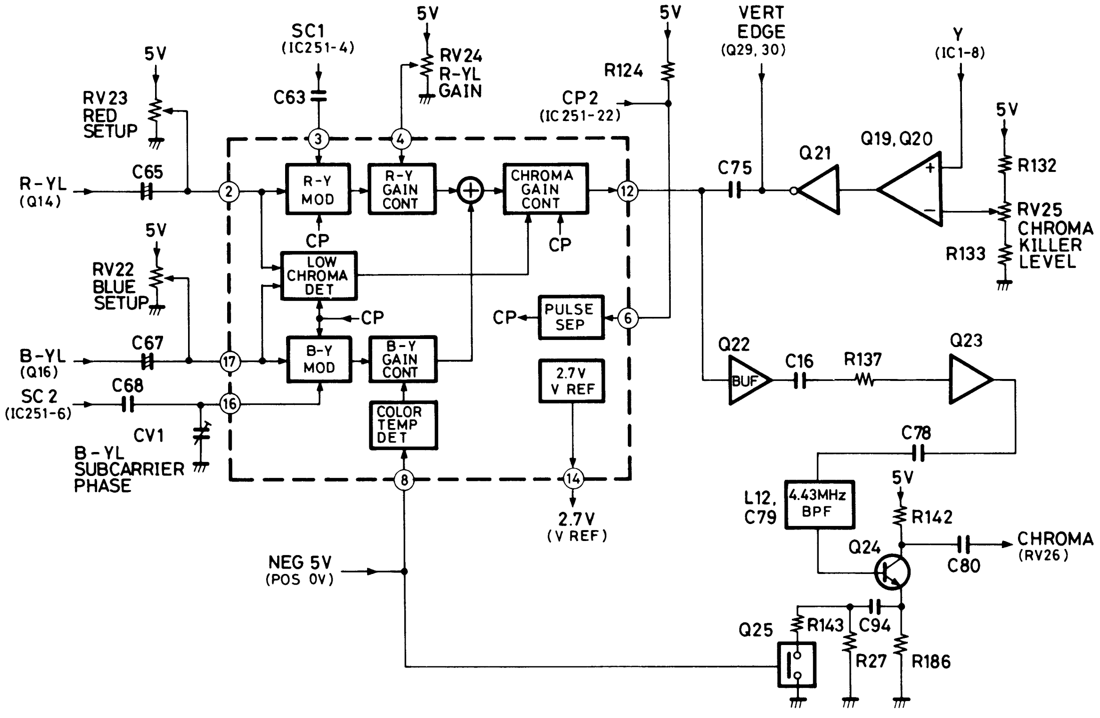

5V
RV23
RED
SETUP
R-YL
(Q14)
C65
5V
RV22
BLUE
SETUP
B-YL
(Q16)
C67
SC 2
(IC251-6)
C68
CV1
B-YL
SUBCARRIER
PHASE
SC1
(IC251-4)
C63
5V
RV24
R-YL
GAIN
R-Y
MOD
R-Y
GAIN
CONT
CHROMA
GAIN
CONT
CP
LOW
CHROMA
DET
CP
B-Y
MOD
B-Y
GAIN
CONT
COLOR
TEMP
DET
PULSE
SEP
2.7V
V REF
2.7V
(V REF)
NEG 5V
(POS 0V)
5V
R124
CP2
(IC251-22)
VERT
EDGE
(Q29, 30)
C75
Q21
Q19, Q20
Y
(IC1-8)
5V
R132
RV25
CHROMA
KILLER
LEVEL
R133
Q22
BUF
C16
R137
Q23
C78
L12,
C79
4.43MHz
BPF
5V
R142
Q24
C80
CHROMA
(RV26)
Q25
R143
C94
R27
R186
2
3
4
6
8
12
14
16
17

Fig. 3-10 Chroma encoder circuit

IC1, pin 8, is applied to the base of Q19. The reference voltage is applied to the base of Q20 from the chroma killer level control RV25. These two transistors Q19 and Q20 operate as an operational amplifier, therefore, the Y signal level is higher than the reference voltage applied causing the output of this operational amplifier to rise. The inverter Q21 generates a decreased chroma suppression signal by means of the increased input voltage, which is added to the chroma signal from IC11, pin 12. The vertical edge transition and high luminance chroma suppression corrected chroma signal is buffered and amplified by Q22 and Q23 and is then applied through the 4.43 MHz bandpass filter circuit composed of L12 and C79 to the amplifier Q24. The amplified chroma signal is applied to the chroma gain control RV26. When the pos/neg switch is set to "NEG", the 5V B+ source is applied to the color temperature detector circuit, causing the gain of the B-YL gain control circuit to be set to the 3200 K color temperature. At this time, Q25 is turned "on" by this 5V B+ source, causing R143 to be grounded. As a result, high frequency of the chroma signal is amplified more.

10. Video processing and Neg/Pos inversion circuit (Fig. 3-11)

The YH signal from DL3 is applied to the buffer amplifier in IC3. The buffered YH signal leaves the IC via pin 10 and reenters the IC via pin 12. The buffered YH signal is also applied to the 200 ns delay line DL4. The delayed YH signal is then applied through the buffer amplifier to the YH signal amplifier and to the horizontal aperture generator circuit. As pin 11 of IC3 is not terminated to DL4, the delayed YH signal is reflected at this pin 11 and is passed through the delay line DL4 again. The twice delayed YH signal is added to the nondelayed YH signal at pin 12. The horizontal aperture generator circuit adds the 200 ns delayed and 400 ns delayed YH signals to generate a horizontal aperture or peaking signal. The vertical aperture signal is also applied from the vertical edge correction signal generator circuit to the vertical aperture amplifier circuit in IC3. The amplified vertical edge signal is added to the horizontal aperture signal. This added H/V aperture signal is added to the chroma signal from pin 7, with the YH signal from the YH amplifier.

The Y signal from IC1 is applied to the 700 kHz lowpass filter circuit composed of L2 and C12, which generates the YL signal which is applied through the chroma black clip control RV30 to the YL amplifier circuit in IC3. The amplified YL signal is clamped by the discharging of C13 connected pin 5 while applying the CP2 from the pulse separation circuit, and is then applied to the low light suppression detector. The output of the low light suppression detector is applied to the aperture suppression circuit and is also applied to the chroma suppression circuit to correct the color noise when the YL signal is at a low level. The aperture corrected Y signal leaves the IC via pin 15 and is then applied through the buffer amplifier Q10 to the neg/pos inversion circuit. The Y signal is first clamped to the 1.8V reference voltage applied from IC1, pin 14, via Q4 while applying CP2 applied from IC251, pin 22. When the pos/neg switch SW1005 is set to the "POS" position, "Hi" voltage is applied to the base of Q6, causing Q6 to turn "off", therefore, the clamped Y signal is applied through buffer amplifiers Q5 and Q7 to the clamp circuit in IC3 through pin 16, with the VTR character signal from Q3. The reentered Y signal is clamped and blanked by adding the CP2 and C BLK pulses from the pulse separator in IC3. The horizontal and vertical sync signals applied from the sync generator IC251, pin 17, 4.43 MHz chroma burst signal applied from the 4.43 MHz bandpass filter circuit and pedestal which is controlled by the Y setup control RV6 are then added to the video signal to generate a complete video output signal. The video signal leaves the IC via pin 1 and is then coupled to the EVF and the VTR out/in line.

The BSC signal from IC251 is combined with the burst signal and 4.43 MHz subcarrier signal, which is applied through the burst level control RV4, to color phase control circuits Q18 and Q42. The phase of the positive BSC is changed the pos video color phase control RV21 to correct the phase, and the phase of the negative BSC is changed by the neg. video color phase control RV20. The phase corrected BSC signals are applied to the burst control circuit in IC11 respectively. The output of the burst control circuit which is controlled by the color temperature detector circuit, leaves the IC via pin 15 and is applied to the 4.43 MHz bandpass filter circuit composed of L3 and C17.

When the pos/neg switch SW1005 is set to the "POS" position, the 5V B+ source is applied through SW1005 to the base of Q6 and D2, causing Q6 and Q43 to turn "off". Therefore, the buffered Y signal from Q5 is applied to the clamp circuit through pin 16. At this time, the burst control circuit generates a 4.43 MHz BSC signal which matches 3200 K lighting for the positive video signal. When SW1005 is changed to the "NEG" position, voltage at base of Q6 and Q43 become "Lo", causing Q6 and Q43 to turn "on". As a result, the buffered Y signal from Q5 is grounded via Q6. However, the inversion circuit composed of Q32 to Q36 turns "on" by means of Q43 turning "on". The clamped Y signal is applied through buffer amplifiers Q33 and Q34 to the inverter Q35. The C BLK pulse from IC251, pin 18, is inverted via Q36 and is added to the inverted Y signal. The inverted Y signal with the C BLK pulse is then applied through the buffer amplifier Q8 to the clamp circuit through pin 16. At this time, the 5V source from Q43 is applied to the color temperature detector in IC11 through pin 8, therefore, the burst control circuit generates a 4.43 MHz BSC signal which matches 6000 K lighting for the negative video signal. As a result, the negative video signal is processed in IC11 and is then coupled to the EVF and video out/in line.

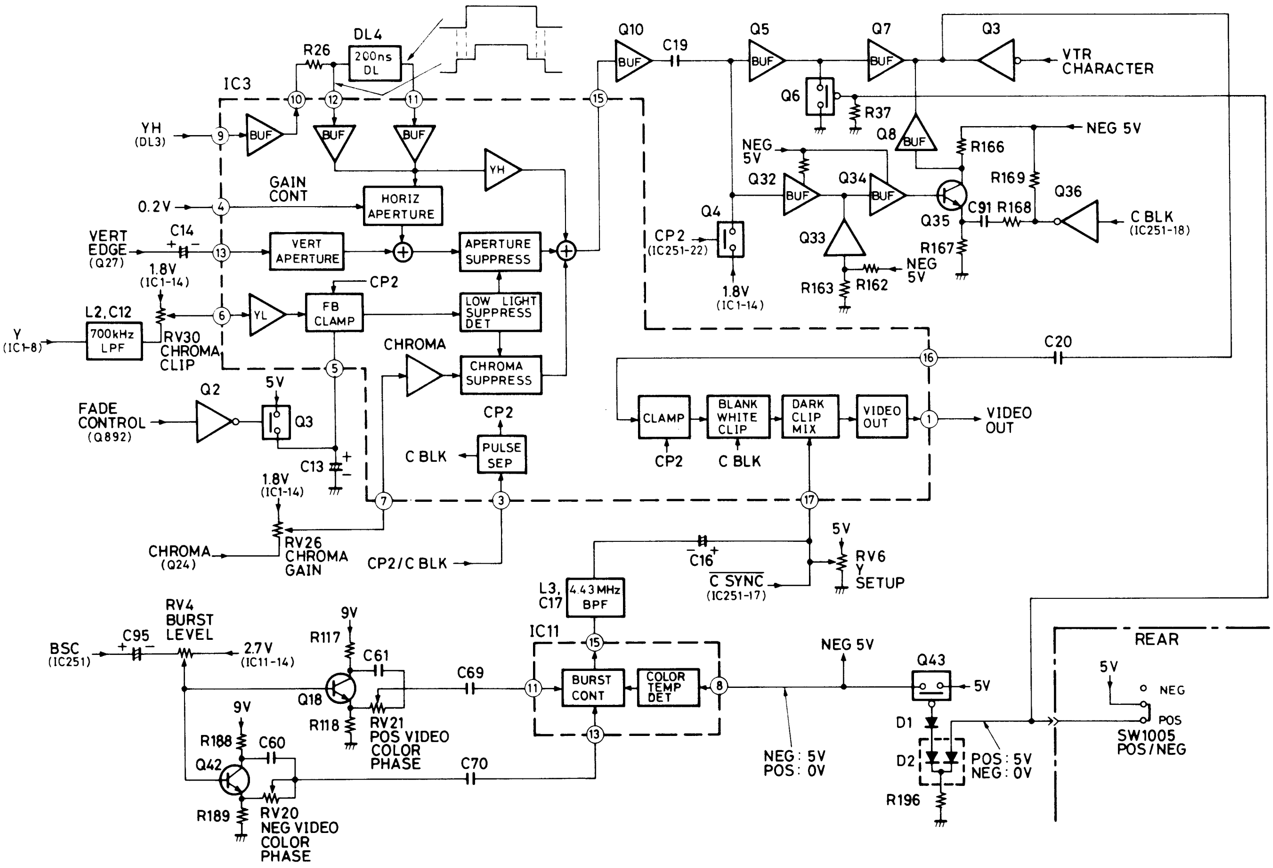

DL4
R26
200ns DL
IC3
Q10
BUF
C19
Q5
BUF
Q7
BUF
Q3
VTR CHARACTER
Q6
R37
Q8
BUF
R166
NEG 5V
YH (DL3)
BUF
BUF
BUF
YH
GAIN CONT
0.2V
HORIZ APERTURE
NEG 5V
Q32
BUF
Q34
BUF
R169
Q36
Q4
Q35
C91 R168
C BLK (IC251-18)
VERT EDGE (Q27)
C14
1.8V (IC1-14)
VERT APERTURE
APERTURE SUPPRESS
CP2 (IC251-22)
Q33
R167
NEG 5V
CP2
L2, C12
700kHz LPF
RV30 CHROMA CLIP
Y (IC1-8)
YL
FB CLAMP
LOW LIGHT SUPPRESS DET
1.8V (IC1-14)
R163
R162
C20
CHROMA
CHROMA SUPPRESS
Q2
5V
FADE CONTROL (Q892)
Q3
C13
1.8V (IC1-14)
CP2
PULSE SEP
C BLK
CLAMP
BLANK WHITE CLIP
DARK CLIP MIX
VIDEO OUT
VIDEO OUT
CP2
C BLK
CHROMA (Q24)
RV26 CHROMA GAIN
CP2/C BLK
5V
C16
RV6 Y SETUP
C SYNC (IC251-17)
L3, C17
4.43MHz BPF
IC11
RV4 BURST LEVEL
BSC (IC251)
C95
2.7V (IC11-14)
9V
R117
C61
C69
Q18
BURST CONT
COLOR TEMP DET
NEG 5V
Q43
5V
R118
RV21 POS VIDEO COLOR PHASE
9V
R188
C60
Q42
C70
R189
RV20 NEG VIDEO COLOR PHASE
NEG: 5V
POS: 0V
D1
D2
POS: 5V
NEG: 0V
R196
REAR
5V
NEG
POS
SW1005 POS/NEG

Fig. 3-11 Video processing and Neg/Pos inversion circuit

CHARACTER SIGNAL GENERATOR CIRCUITS

1. Key matrix circuit (Fig. 4-1)

The character signal generator control microprocesser IC801 generates 4-bit digital control signals via pins 41 to 44 and these signals are applied to the key matrix scan signal generator IC804 which is composed of the 4-bit data latch and BCD to hex. decimal decoder circuits. When the "Lo" inhibit signal is applied to pin 23 and the inverted "Hi" strobe signal is applied to pin 1, the BCD to hex. decimal decoder circuit generates 16 "Hi" or "Lo" signals depending on 4-bit control signals input. 4 of these 16 signals are applied to the key matrix circuit on the VTR control circuit board. The microprocesser IC801 detects the mode using the one signal of these 4 key matrix scan signals, which is applied to pin 41 through pin 44, by pressing the mode selection switch. For example, when the + shift switch SW1042 is pressed, the switching Q959 turns "on", therefore, the C2 signal of the scan signal is applied to pin 44 of IC801.

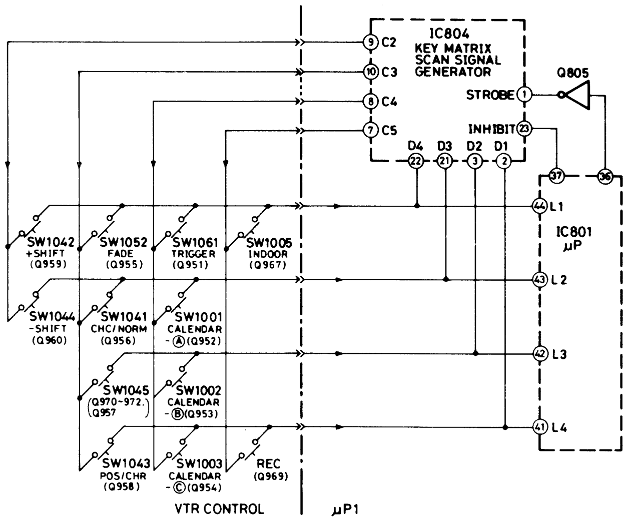

IC804
KEY MATRIX SCAN SIGNAL GENERATOR
9 C2
10 C3
8 C4
7 C5
STROBE 1
INHIBIT 23
D4 22
D3 21
D2 3
D1 2
Q805
37
36
44 L1
43 L2
42 L3
41 L4
IC801 μP
SW1042 +SHIFT (Q959)
SW1052 FADE (Q955)
SW1061 TRIGGER (Q951)
SW1005 INDOOR (Q967)
SW1044 -SHIFT (Q960)
SW1041 CHC/NORM (Q956)
SW1001 CALENDAR -Ⓐ(Q952)
SW1045 (Q970~972, Q957)
SW1002 CALENDAR -Ⓑ(Q953)
SW1043 POS/CHR (Q958)
SW1003 CALENDAR -Ⓒ(Q954)
REC (Q969)
VTR CONTROL
μP1

Fig. 4-1 Key matrix circuit

2. Character signal generator control microprocessor input/output composition (Fig. 4-3)

When the power is first turned on, the character signal generator control microprocessor IC801 is initialized, and then the program is executed by the procedure shown in the Fig. 4-2.

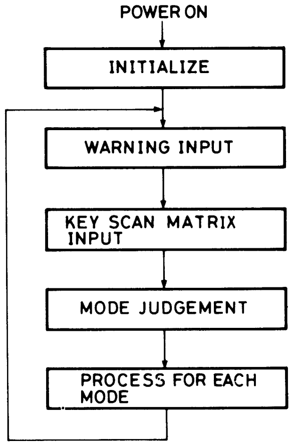

POWER ON
INITIALIZE
WARNING INPUT
KEY SCAN MATRIX INPUT
MODE JUDGEMENT
PROCESS FOR EACH MODE

Fig. 4-2 Microprocessor program configuration

Input

1. White balance warning (Pin 2)
   This signal is applied from the automatic white balance control IC201, pin 8; when "Lo" voltage is input, it means that the correct white balance has not been obtained, the μP detects the white balance warning mode and generates 8-bit data via pins 21 through 26, 28 and 30 to flash the graphics "WHITE BALANCE". During the operation check, the graphics "WHITE BALANCE" will be displayed and the graphics "OUT" will flash. When the μP inputs the "Hi" voltage, the graphics "WHITE BALANCE" will go off. During the operation check, the graphics "WHITE BALANCE OK" will be displayed.
2. Power save (Pin 11)
   This input detects the power save mode; when the power save switch is set to the "PWR SAVE" position, the M5V source becomes 0V, therefore, the μP detects the power save mode. When the power save switch is set to the "NORM" position, the M5V source is applied to this input.
3. Recording (Pin 12)
   This signal is applied from the VTR via the camera connector; when the "Lo" voltage is input, the μP detects that the VTR is in the record or record/pause mode. When the "Hi" voltage is input, the μP detects

that the VTR is in a mode other than the record or record/pause mode. When the μP detects that the VTR is in a mode other than the record or record/pause mode, the VTR trigger output via pin 20 is disabled.

4. Low battery warning (Pin 16)
   This input detects the low battery mode; when the low battery signal is applied to the low battery detection circuit from the VTR, the low battery detection circuit IC601 generates a "Lo" voltage via pin 1, therefore, the "Lo" voltage is applied to this input pin 16. As a result, the μP detects the low battery mode and generates 8-bit data to flash the graphics "BATTERY". During the operation check, the graphics "BATTERY" will be displayed and the graphics "OK" will flash. When the μP inputs "Hi" voltage, the graphics "BATTERY" will go off. During the operation check, the graphics "BATTERY OK" will be displayed.
5. Busy (Pin 50)
   This input detects the busy mode; when the clock IC805 counts up the time, the "Lo" voltage of the busy signal is generated via the clock IC805, therefore, the "Lo" voltage is applied to this input pin 50. As a result, the μP detects the busy mode, and the 8-bit data input/output is disabled.
6. Low light warning (Pin 52)
   This input detects the low light mode; when the low light mode is detected via the luminance processing IC2, the luminance processing IC2 generates "Lo" voltage via pin 6, therefore, "Lo" voltage is applied through D964 to this input pin 52. As a result, the μP detects the low light mode and generates 8-bit data to flash the graphics "LOW LIGHT". During the operation check, the graphics "LIGHT" will be displayed and the graphics "LOW" will flash. When the μP inputs the "Hi" voltage, the graphics "LOW LIGHT" will go off. During the operation check, the graphics "LIGHT OK" will be displayed. When the mode switch is pressed, the "Hi" inhibit signal is applied to this input pin 52 to inhibit the low light warning graphics display.

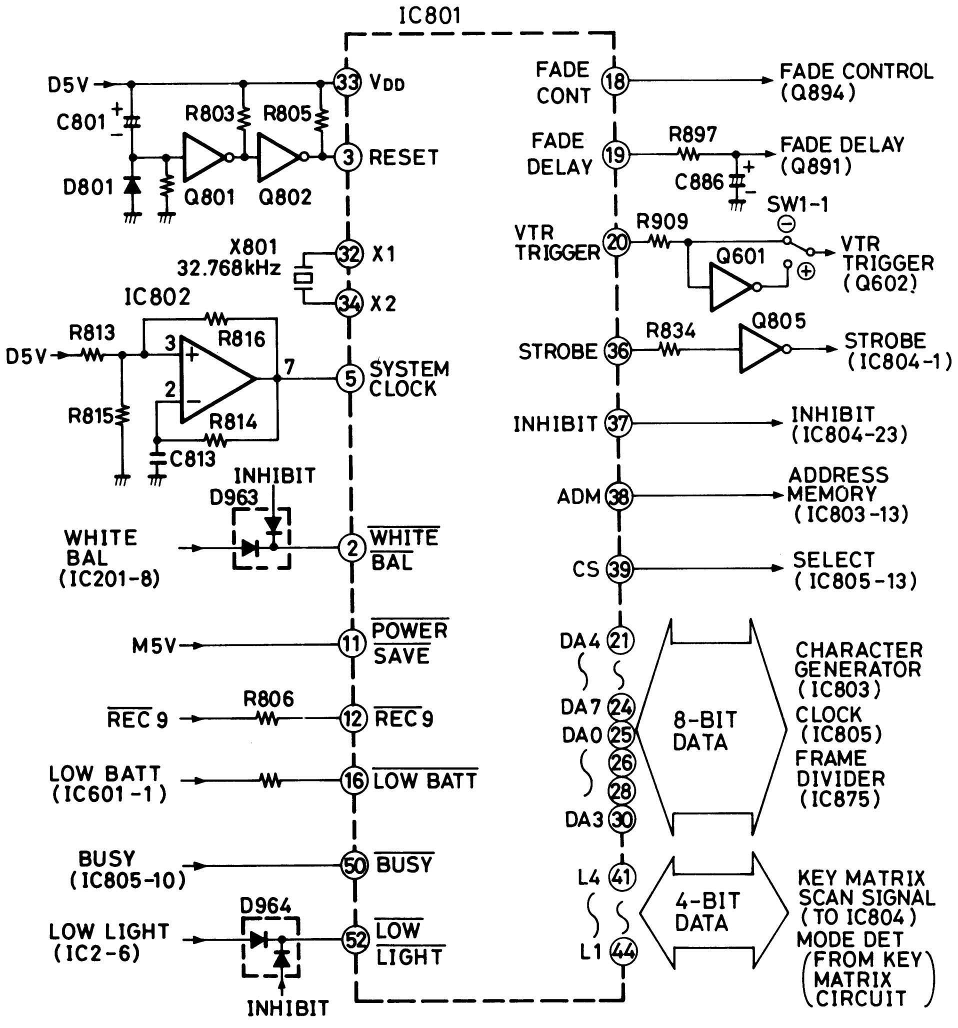

IC801
D5V
C801
R803
R805
33 VDD
3 RESET
D801
Q801
Q802
X801
32.768kHz
32 X1
34 X2
IC802
R813
D5V
R816
3
2
7
5 SYSTEM CLOCK
R815
R814
C813
INHIBIT
D963
WHITE BAL (IC201-8)
2 WHITE BAL
M5V
11 POWER SAVE
R806
REC 9
12 REC 9
LOW BATT (IC601-1)
16 LOW BATT
BUSY (IC805-10)
50 BUSY
D964
LOW LIGHT (IC2-6)
52 LOW LIGHT
INHIBIT
FADE CONT 18
FADE CONTROL (Q894)
FADE DELAY 19
R897
C886
FADE DELAY (Q891)
SW1-1
R909
VTR TRIGGER 20
Q601
VTR TRIGGER (Q602)
R834
Q805
STROBE 36
STROBE (IC804-1)
INHIBIT 37
INHIBIT (IC804-23)
ADM 38
ADDRESS MEMORY (IC803-13)
CS 39
SELECT (IC805-13)
DA4 21
DA7 24
DA0 25
26
28
DA3 30
8-BIT DATA
CHARACTER GENERATOR (IC803)
CLOCK (IC805)
FRAME DIVIDER (IC875)
L4 41
L1 44
4-BIT DATA
KEY MATRIX SCAN SIGNAL (TO IC804)
MODE DET (FROM KEY MATRIX CIRCUIT)

Fig. 4-3 Character signal generator control μP I/O composition

Output

1. Fade control (Pin 18)
   This fade control signal controls the fade signal generating circuit; when the µP detects the fade in mode by the pressing of the VTR trigger switch after pressing the fade switch, the µP generates "Lo" voltage for approx. 8 seconds. When the µP detects the fade out mode, the µP generates "Lo" voltage for approx. 6 seconds. After that, the µP generates "Hi" voltage.
2. Fade delay (Pin 19)
   This fade delay signal controls the fade signal generating circuit; this fade delay signal is integrated and then applied to the fade signal generating circuit. When the µP detects the fade in mode by the pressing of the VTR trigger switch after pressing the fade switch, the µP generates "Hi" voltage after 2 seconds. In fade out, the µP generates "Lo" voltage at this time.
3. VTR trigger (Pin 20)
   The VTR trigger signal controls the start (record) and stop (record/pause) of the VTR; is outputs "Lo", and "Hi" repeatedly every time the VTR trigger switch is pressed. When the µP is initialized, "Lo" voltage is generated. This VTR trigger signal is inverted via the inverter Q602 or is inverted twice via the inverters Q601 and Q602 depending on the position of the pause polarity switch SW1-1, and is then applied through the camera connector to the VTR.
4. Strobe (Pin 36)
   This strobe signal is inverted via the inverter Q805 and is then applied to the key matrix scan signal generator IC804. When "Lo" voltage is generated, the key matrix scan signal generator IC804 inputs the 4-bit key matrix scan data applied from pins 41 through 44 of the µP IC801.
5. Inhibit (Pin 37)
   This inhibit signal is applied to the key matrix scan signal generator IC804 to inhibit the key matrix scan signal output. When "Hi" voltage is generated, the key matrix scan signal output is disabled. When "Lo" voltage is generated, the key matrix scan signals are generated via the key matrix scan signal generator IC804 and are applied to the key matrix circuit.
6. Address memory (Pin 38)
   This address memory signal is applied to the character signal generator IC803 to control the data writing. When "Lo" voltage is generated, the 7-bit instruction data is memorized to the instructed address of the memory after latching the 8-bit address data. When "Hi" voltage is applied, the 7-bit instruction data is memorized continuously.
7. Chip select (Pin 39)
   This chip select signal is applied to the clock IC805, pin 13, to write and read the clock data. When "Hi" voltage is generated, clock data writing and reading are enabled. When "Lo" voltage is applied, the clock data writing and reading are disabled.

Input/Output

1. 8-bit data (Pins 21 through 26, 28 and 30)
   (1) The 8-bit address data and 7-bit instruction data are generated in the graphics display mode, and are applied to the character signal generator IC803 to generate a character signal.
   (2) When the µP detects the clock mode, the µP generates 4 control signals; the write signal is generated via pin 21 to write the 4-bit instruction data, the read signal is generated via pin 22 to read the 4-bit data, the write address signal is generated via pin 23 to write the address data and the stop signal is generated via pin 24 to stop the count of the stopwatch counter, which are applied to the clock IC805. In the date/calendar, clock or stopwatch modes, the µP inputs 4-bit date/calendar, clock or stopwatch data after generating the 4-bit address data with 4 control signals. When the date/calendar and clock setting, the µP generates 4-bit selected data after generating the 4-bit address data. The 4-bit address data and selected data are generated via pins 25, 26, 28 and 30.
   (3) The 8-bit data is generated in the graphics display mode, and is applied to the frame divider IC875 to divide the frame.
2. 4-bit data (Pins 41 through 44)
   These pins generate 4-bit data which is applied to the key matrix scan signal generator IC804 to generate the 4 key matrix scan signals applied to the key matrix circuit and 3 control signals, reset, instruction data latch and strobe.
   The 4-bit mode detecting data is applied to these pins when the mode selection switch is pressed.

3. Character signal generator circuit (Fig. 4-4)

The video signal from the buffer amplifier Q605 located on the VTR interface circuit board is applied to the sync separator composed of Q884 through Q886 and the horizontal and vertical sync signals are generated. These sync signals are applied to the lowpass filter composed of C883 and R887 and to the highpass filter composed of C882 and R886. The vertical sync signal generated via the lowpass filter is inverted via the inverter Q882 and is then applied through pin 7 to the horizontal/vertical position control circuit in the character signal generator IC803 to synchronize vertical scanning. The vertical sync signal from the highpass filter is also inverted via the inverter Q881 and is then applied through pin 8 to the horizontal/vertical position control circuit in IC803 to synchronize horizontal scanning. The clock generator in IC803 generates a 6.5 MHz clock signal with C805 and RV801 connected between pins 9 and 10. When the power is first applied to the character signal generator control microprocessor IC801, IC801 is initialized, and then the "Hi" voltage reset pulse is generated via the key matrix scan signal generator IC804, pin 18. This "Hi" voltage reset pulse is inverted via the inverter Q807 and is then applied to the character signal generator

IC803, pin 1, to reset the circuit. The character signal generator control microprocessor IC801 outputs the 8-bit address data and 7-bit data via pins 21 through 26, 28 and 30 after detecting the character display mode. The address data is latched at the rising edge of the instruction data latch (LDI) pulse applied from IC804, pin 17. The character code and blinking data, character display horizontal position data, character display vertical position data, and character size and blinking data are stored in the addressed memory at the trailing edge of the LDI pulse.

The character signal is generated via the character generator circuit and it leaves the IC via pin 5 in sequence synchronized with the timing pulse generated by the timing oscillator circuit. The character signal is then branched into two parts; one is applied to the inverter Q875 which inverts the character signal added to the EVF video signal, and the other is applied to the inverter Q879 which inverts the character signal added to the VTR video signal. When the "Hi" voltage is applied to the inverter Q880 from the NOR gate circuit in IC878, pin 3, in the frame divider circuit, causing Q880 to turn "on", therefore, the "Lo" voltage is applied to the inverter Q879. As a result, Q879 turns "on" and inverts the character signal.

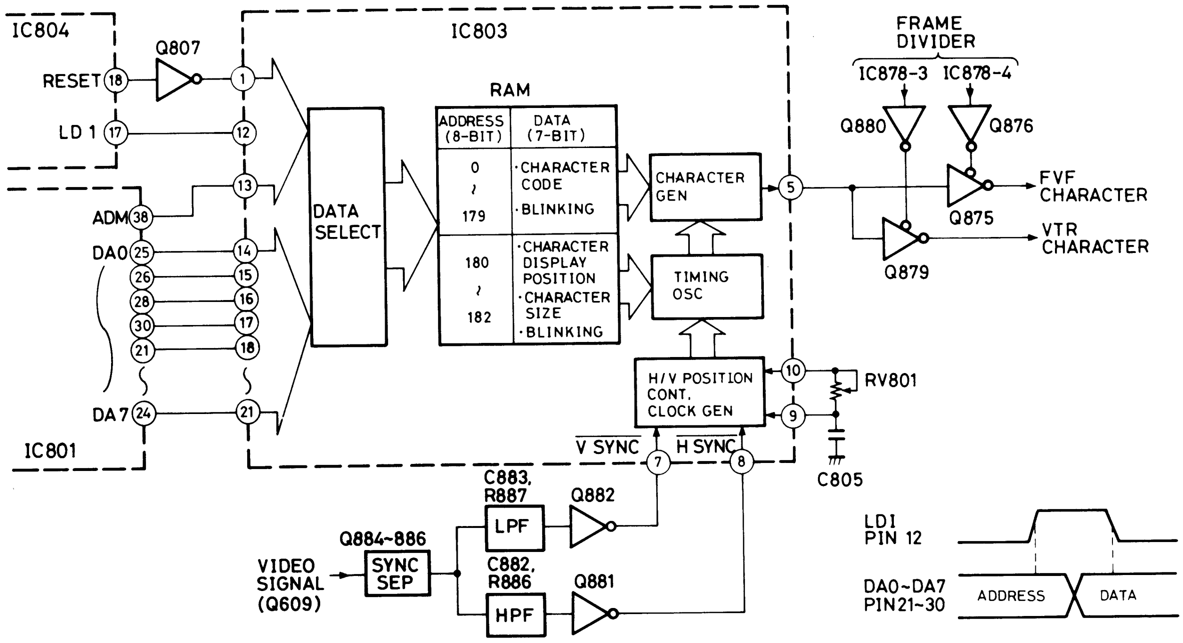

IC804
RESET 18
LD 1 17
Q807
IC803
RAM
ADDRESS (8-BIT)
DATA (7-BIT)
0 ~ 179
·CHARACTER CODE
·BLINKING
180 ~ 182
·CHARACTER DISPLAY POSITION
·CHARACTER SIZE
·BLINKING
DATA SELECT
CHARACTER GEN
TIMING OSC
H/V POSITION CONT. CLOCK GEN
ADM 38
DA0 25
26
28
30
21
DA7 24
IC801
1
12
13
14
15
16
17
18
21
5
10
9
7
8
V SYNC
H SYNC
RV801
C805
FRAME DIVIDER
IC878-3
IC878-4
Q880
Q876
Q875
Q879
EVF CHARACTER
VTR CHARACTER
C883, R887
Q882
LPF
Q884~886
SYNC SEP
VIDEO SIGNAL (Q609)
C882, R886
Q881
HPF
LDI PIN 12
DA0~DA7 PIN21~30
ADDRESS
DATA

Fig. 4-4 Character signal generator circuit

4. Clock circuit (Fig. 4-5)

The clock oscillator circuit in the clock IC805 generates a 32.768 kHz clock signal using the crystal X802 connected to pins 14 and 15. This 32.768 kHz clock is divided down to 1 Hz via the 32768 divider circuit and it is applied to the counter circuits to count the time. When initially setting the time and date/calendar, the character signal generator control microprocessor IC801 generates the chip select signal "Hi" voltage via pin 39, the write pulse via pin 21, the address write pulse via pin 23, and 4-bit address data and 4-bit data via pins 25, 26, 28 and 30. The 4-bit address data is latched at the "Hi" voltage of the address write pulse and then the 4-bit data is stored in the addressed counter circuit at the "Hi" voltage of the write pulse applied from pin 2. When the initial setting is completed, the counter circuits start counting. When the μP IC801 detects the stopwatch, time and date/calendar graphics display modes, the μP generates the address write pulse, the read pulse and 4-bit address data. The 4-bit address data is latched at the "Hi" voltage of the address write pulse and then the addressed data is read at the "Hi" voltage of the read pulse. The data is generated via pins 4 through 7 and is then applied to the μP, therefore, the μP transmits 8-bit character display data to the character signal generator IC803 depending on the 4-bit data, to display the graphics in the EVF.

When the camera is disconnect from the VTR or from the camera power supply, the D5V source becomes 0V. However, the B+ source for the clock IC805 is applied from the backup battery at this time, therefore, the clock IC805 continues counting.

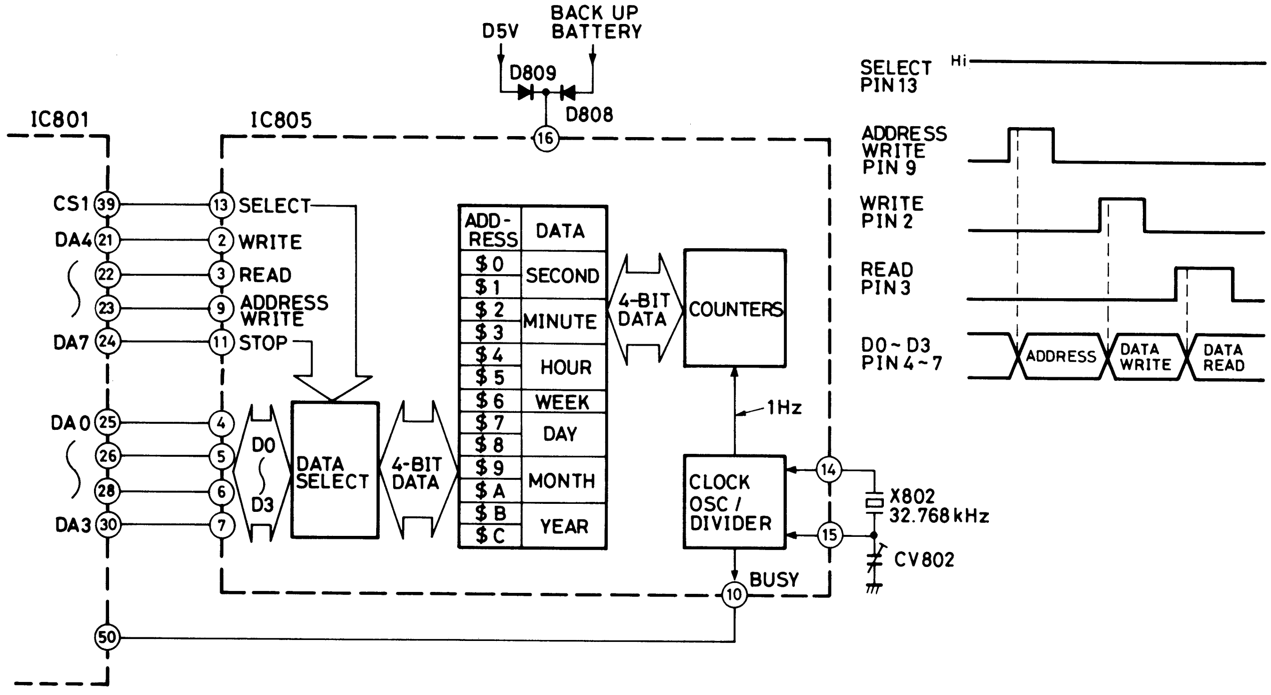

BACK UP
D5V
BATTERY
D809
D808
IC801
IC805
CS1
DA4
DA7
DA0
DA3
SELECT
WRITE
READ
ADDRESS WRITE
STOP
D0
D3
DATA SELECT
4-BIT DATA
ADD-RESS
DATA
$0
$1
$2
$3
$4
$5
$6
$7
$8
$9
$A
$B
$C
SECOND
MINUTE
HOUR
WEEK
DAY
MONTH
YEAR
COUNTERS
1Hz
CLOCK OSC / DIVIDER
BUSY
X802
32.768kHz
CV802
SELECT PIN13
Hi
ADDRESS WRITE PIN 9
WRITE PIN 2
READ PIN3
D0~D3 PIN4~7
ADDRESS
DATA WRITE
DATA READ

Fig. 4-5 Clock circuit

5. Frame divider circuit (Fig. 4-6)

This circuit is responsible for dividing the frame; the character signal added to the video signal is divided for the EVF video signal and VTR video signal. The character signal generator control microprocessor IC801 generates the 8-bit frame dividing data via pins 21 through 26, 28 and 30 depending on the detected display mode. The 8-bit frame dividing data is applied to both the 4-bit latch circuits in the latch IC875 and is then latched at the trailing edge of the strobe pulse applied from the key matrix scan signal generator IC804, pin 20, after reading the 8-bit frame dividing data at the rising edge of the strobe pulse. The latched 8-bit frame dividing data is applied to the parallel clock counter composed of IC877 and IC876. The vertical sync signal is applied to pin 1 of both the down binary counters IC877 and IC876 from the inverter Q883 as a preset enable pulse. The inverted horizontal sync pulse (H SYNC) is also applied to pin 15 of IC877 and IC876 from the inverter Q881 as a clock pulse. At the counter IC877, the 4-bit data of the latched 8-bit frame dividing data is preset at the rising edge of the V SYNC, and then the counter starts counting down every time H SYNC is applied, because the carry input, pin 5, is grounded. At this time, the output, pin 7, generates a "Hi" voltage which is applied to the carry input, pin 5, of the other counter IC876, therefore, the counter IC876 keeps no counting. When the IC877 counts down to 0, the "Hi" voltage output, pin 7, becomes "Lo" voltage, therefore, the counter IC876 starts counting down in the same way as the counter IC877. When the counter IC876 counts down to 0, the "Lo" voltage is generated via pin 7. This "Lo" voltage is applied to both inputs of the NOR gate circuit in IC878, pins 12 and 13, causing this NOR gate circuit to generate the "Hi" voltage. The "Hi" voltage is applied to pin 6 of the flip-flop circuit composed of two NOR gate circuit in IC878, as a set pulse, therefore, the "Hi" voltage output via pin 4 becomes the "Lo" voltage and the "Lo" voltage output via pin 3 becomes the "Hi" voltage. The "Lo" voltage output via pin 4 is applied to the inverter Q876, causing Q876 to turn "off", therefore, the character signal from the character signal generator IC803 is not added to the EVF video signal. However, the "Hi" voltage output via pin 3 is also applied to the inverter Q880 at the same time, causing Q880 to turn "on". As a result, the character signal is added to the VTR video signal. When the V SYNC is applied to pin 1 of IC878, the flip-flop circuit is reset, and the "Hi" voltage is generated via pin 4 and the "Lo" voltage is generated via pin 3.

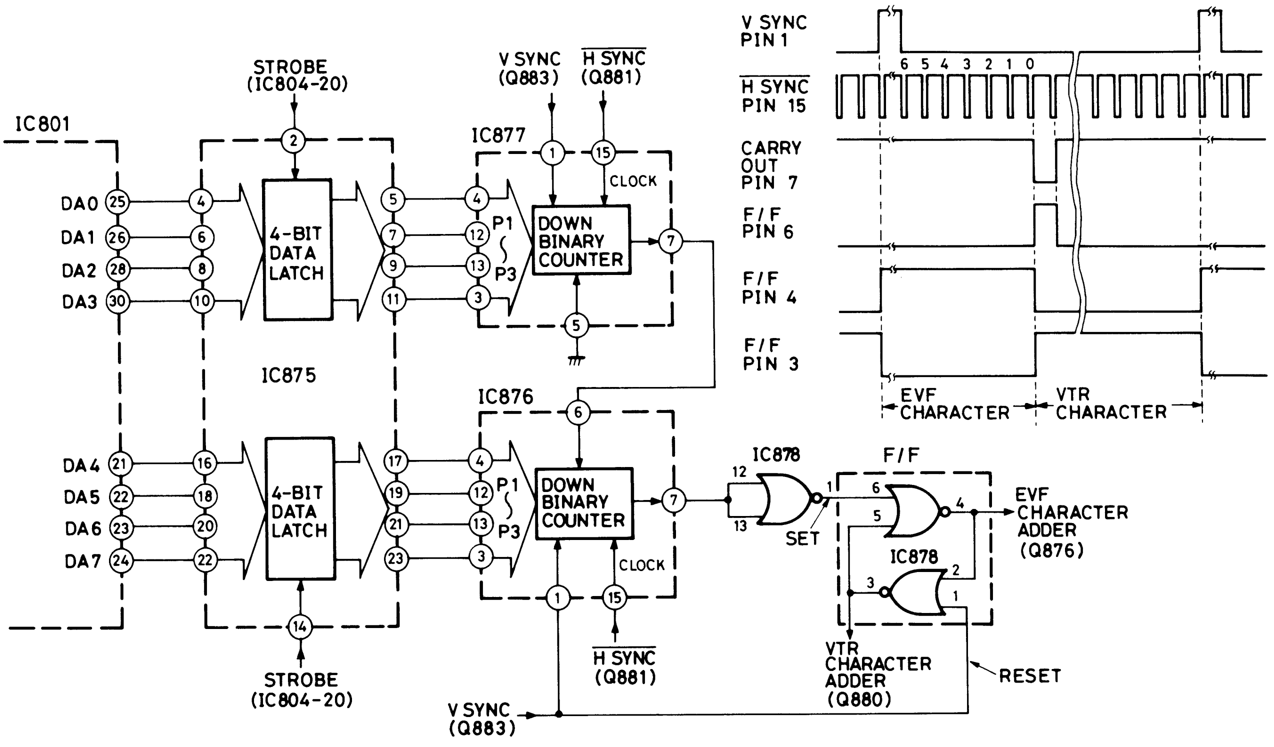

STROBE
(IC804-20)
V SYNC
(Q883)
H SYNC
(Q881)
IC801
IC877
DA0
DA1
DA2
DA3
4-BIT
DATA
LATCH
P1
P3
DOWN
BINARY
COUNTER
CLOCK
IC875
IC876
DA4
DA5
DA6
DA7
STROBE
(IC804-20)
H SYNC
(Q881)
V SYNC
(Q883)
IC878
F/F
SET
EVF
CHARACTER
ADDER
(Q876)
VTR
CHARACTER
ADDER
(Q880)
RESET
V SYNC
PIN 1
H SYNC
PIN 15
6 5 4 3 2 1 0
CARRY
OUT
PIN 7
F/F
PIN 6
F/F
PIN 4
F/F
PIN 3
EVF
CHARACTER
VTR
CHARACTER

Fig. 4-6 Frame divider circuit

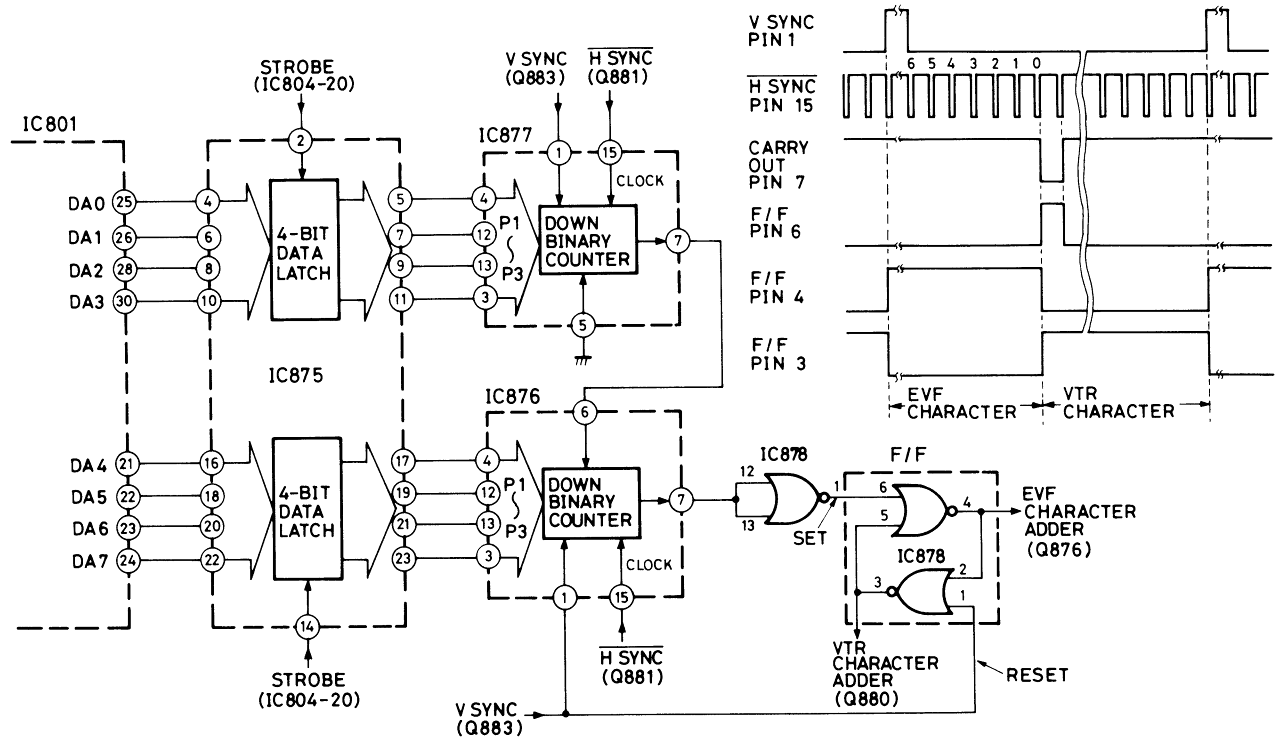

IC801
DA0
DA1
DA2
DA3
DA4
DA5
DA6
DA7
STROBE
(IC804-20)
4-BIT
DATA
LATCH
IC875
V SYNC
(Q883)
H SYNC
(Q881)
IC877
CLOCK
DOWN
BINARY
COUNTER
P1
P3
IC876
IC878
F/F
SET
EVF
CHARACTER
ADDER
(Q876)
VTR
CHARACTER
ADDER
(Q880)
RESET
V SYNC
PIN 1
H SYNC
PIN 15
6 5 4 3 2 1 0
CARRY
OUT
PIN 7
F/F
PIN 6
F/F
PIN 4
F/F
PIN 3
EVF
CHARACTER
VTR
CHARACTER

Fig. 4-6 Frame divider circuit

HITACHI
SERVICE MANUAL

TK | **No. 1980E**

VK-C870E

Technical Data

AUTO FOCUS
COLOR VIDEO CAMERA VK-C870
HITACHI

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes.
   Critical parts are marked with ⚠ in the block diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

July 1983 TOKAI WORKS

CONTENTS

SPECIFICATIONS 1
KEY TO ILLUSTRATIONS 2
DISASSEMBLY 3
Names of circuit boards 3
Camera Disassembly 4
1. Removing Cases 4
2. Removing Circuit Boards 5
3. Removing Electronic Viewfinder 8
4. Removing Camera Tube (SATICON)/ Deflection Coil Assembly 9
5. Removing Lens 11
TROUBLESHOOTING 13
1. No picture 13
2. Colour reproduction poor 15
   2-1 Greenish 15
   2-2 Picture greenish 15
   2-3 Picture reddish 16
   2-4 Picture bluish 16
   2-5 No colour Coloured too much 16
   2-6 Highlight section greenish 16
   2-7 Colour unevenness too much 17
3. White balance correction not possible 17
   3-1 Tint does not change with position of Indoor/Outdoor switch changed? 17
   3-2 Auto white set does not operate 17
   3-3 White balance drifts when auto white is set. . . 17
   3-4 Tint does not change with white balance control turned 18
4. Picture missing in horizontal direction 18
5. Picture missing in vertical direction 18
6. Abnormal black spot is seen in picture 18
7. Sync distortion 19
8. Picture smearing 19
9. Power zoom does not operate 19
10. Trigger button of camera does not operate normally with VTR set to record mode 20
11. Rmote control does not operate properly when combined with remote control VTR 20
12. No picture in electronic viewfinder 21
13. Electronic viewfinder sync distortion 21
14. Picture in electronic viewfinder becomes a single lateral line 22
15. Vertical size of picture in electronic viewfinder shrinks 22
16. Audio monitoring is not possible via earphone jack on camera 23
17. No sound 23
18. Character display defective 24
   18-1 No character signal in video output 24
   18-2 Clock function does not work 24
ADJUSTMENT 25
The table of contents for adjustment is described in details on page 25.
CIRCUIT BOARD CONNECTION DIAGRAM 88
BLOCK DIAGRAM 90
Electronic viewfinder 90
Video 91
Deflection 91
Audio 91
Preamp 91
Mother 91
VTR Interface 91
µCOM-1, -2 94
VTR Control 94
Function 94
EXPLODED VIEW 102
REPLACEMENT PARTS LIST 108

SPECIFICATIONS

System:	Uni-frequency separation system
Signal type:	Based on PAL system
Camera tube:	1/2" SATICON
Synchronization system:	Internal synchronization
Horizontal rezolution:	Better than 250 TV line
Video output:	1 Vp-p 75Ω (Unbalanced)
Video S/N ratio:	45 dB or more
Standard object luminance:	500 lux
Minimum luminance required:	10 lux
Built-in microphone:	Uni-directivity electret condenser microphone
External mic input:	–65 dB, low impedance
Audio line output:	–20 dB, high impedance
Lens (accessory):	F1.4, f = 8.5 – 51 mm zoom (x 6)
Lens mount:	Special mount (with auto focus, auto iris power zoom, macro mechanism)
Dia. of filter screw:	52 mm, thread pitch 0.75 mm
Viewfinder:	Electronic viewfinder system Cathode ray tube: 1" cathode ray tube Display function: Operation check for camera set-up, Calendar, Time, Stopwatch, Title 1, Title 2, Record, Fade, Warning/Alarm for Battery, White balance and Lighting
Color temperature control:	From tungsten bulb illumination to cloudy weather (color filter concurrently used)
Automatic sensitivity control range:	10 – 100,000 lux
Power voltage:	DC 12 V
Power consumption:	4.4 W (When Auto focus switch is "OFF")
External dimensions:	193(W) x 230(H) x 453(D) mm (Electronic viewfinder and attached mic included)
Weight:	2.6 kg (Electronic viewfinder, attached microphone included)
Accessories:	Electronic viewfinder x 1 Boom microphone x 1

* The specifications and external appearance of this unit may be changed without notice for improvement

KEY TO ILLUSTRATIONS

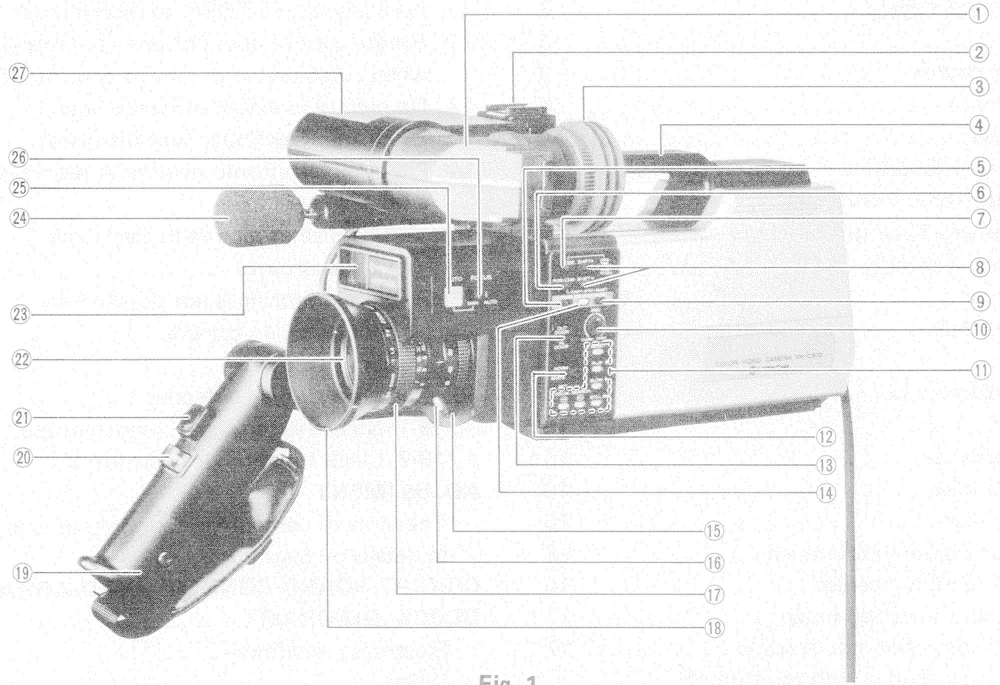


Fig. 1

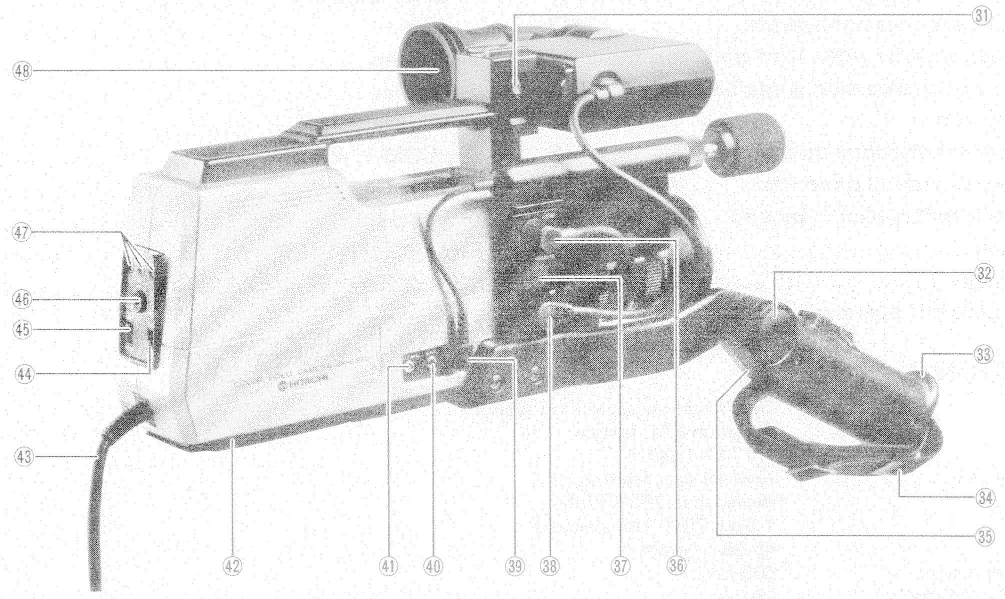


Fig. 2

1. Rotary neck
2. Adaptor shoe
3. Eye cup
4. Grip
5. CHK/CLR switch
6. POS/CHR switch
7. EVF display controls
8. POS/CHR shift switches
9. Fade switch
10. Iris control knob
11. VTR remote controls
12. White balance set switch
13. Outdoor/Indoor select switch
14. Instant review switch
15. Zoom lever
16. Macro switch
17. Focus adjust ring
18. Lens hood
19. Battery compartment
20. Power zoom switch
21. Start/stop switch
22. Zoom lens
23. Rangefinder window
24. Boom microphone
25. Auto focus switch
26. Focus/AUTO/MANUAL select switch
27. Electronic viewfinder
31. Electronic viewfinder lock screw
32. Grip lock screw
33. Grip
34. Hand strap
35. Grip release button
36. Lens connection terminal
37. Camera remote controls connection terminal
38. Electronic viewfinder connection terminal
39. Boom microphone connection terminal
40. Earphone jack
41. External microphone jack
42. Sholder pad
43. Camera cable
44. NEG/NOR select switch
45. Stand-by switch
46. Color balance control knob
47. CALENDER SET switches
48. Diopter control ring

DISASSEMBLY

Names of circuit boards

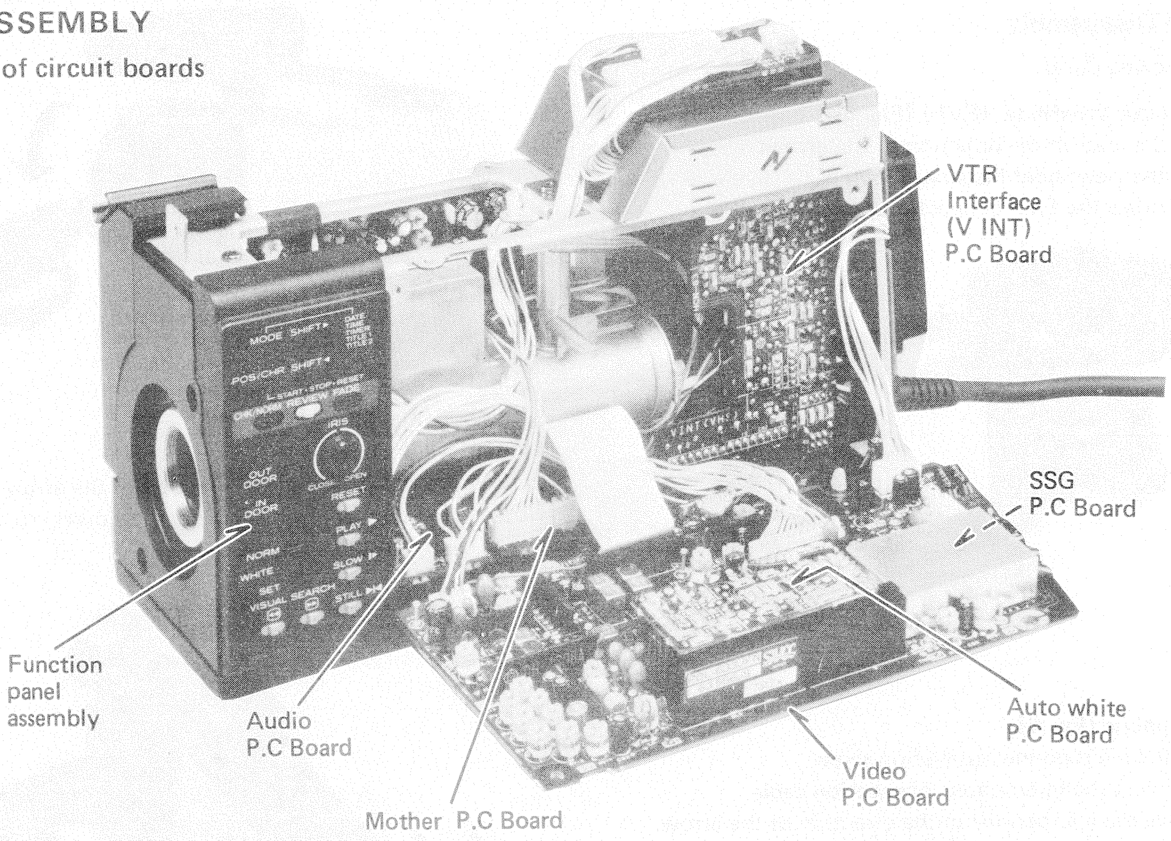

VTR Interface (V INT) P.C Board
SSG P.C Board
Function panel assembly
Audio P.C Board
Auto white P.C Board
Video P.C Board
Mother P.C Board

Fig. 3

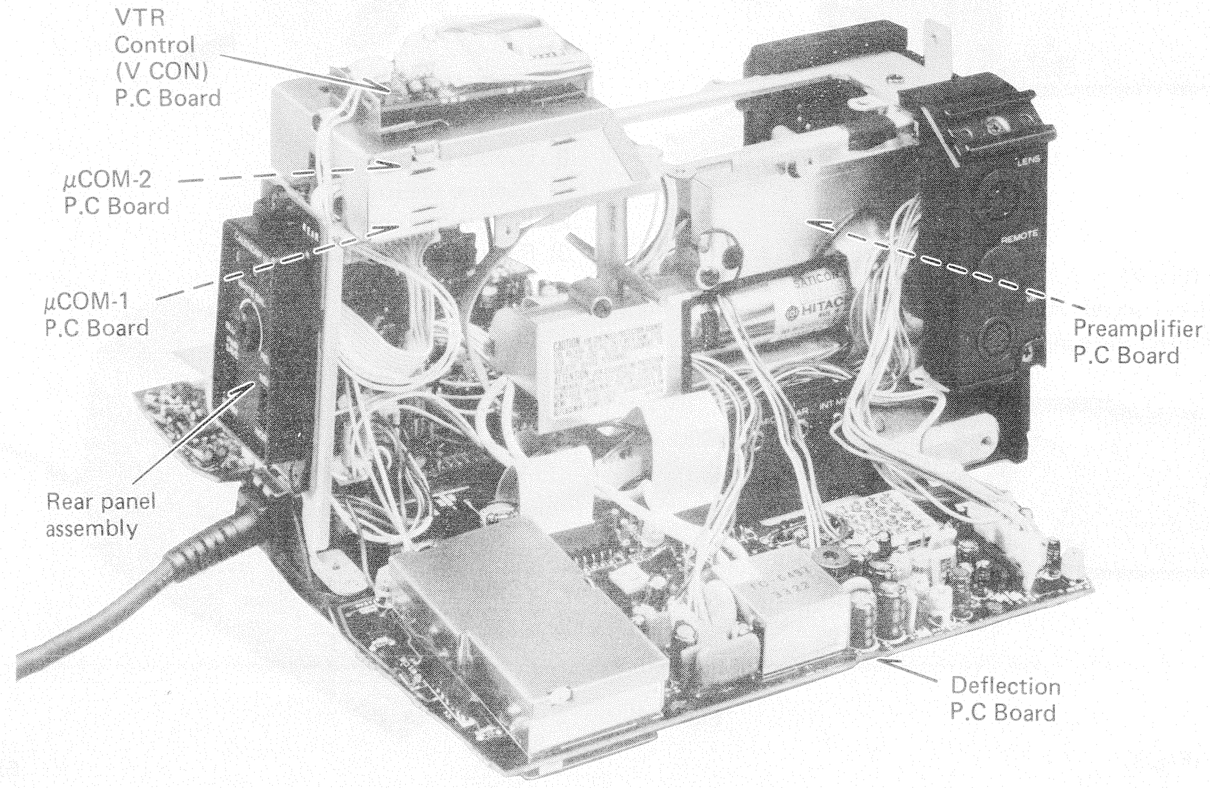

VTR Control (V CON) P.C Board
µCOM-2 P.C Board
µCOM-1 P.C Board
Preamplifier P.C Board
Rear panel assembly
Deflection P.C Board

Fig. 4

Camera Disassembly

1. Removing Cases

1. Electronic viewfinder (EVF) (Fig. 5)

1) Push the lever in the direction of the arrow.
2) Turn the viewfinder installation screw.
3) Disconnect the EVF connection cable.

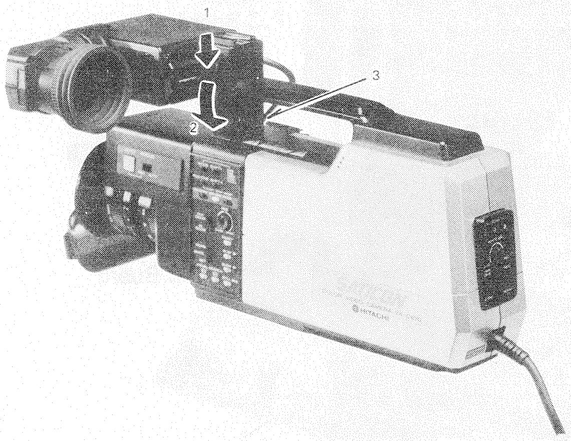


Fig. 5

2. Microphone (Fig. 6)

1) Turn the microphone installation screw.
2) Disconnect the microphone connection cable.
3) Remove the microphone in the direction of the arrow.

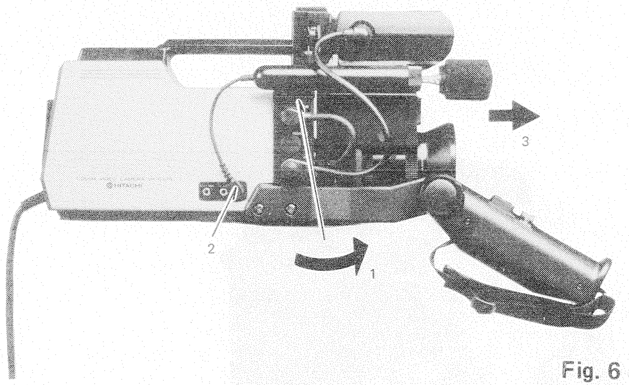


Fig. 6

3. Grip (Fig. 7)

1) Remove 2 screws holding the grip.
2) Disconnect the connector CN1061.

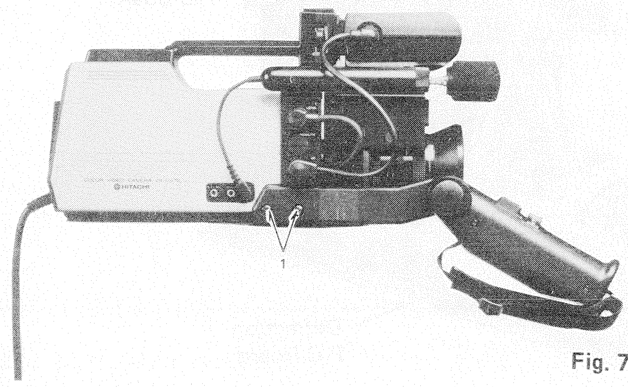


Fig. 7

4. Lens (Fig. 8)

1) Remove the grip.
2) Disconnect the lens connector.
3) Turn the lens in the direction of the arrow.

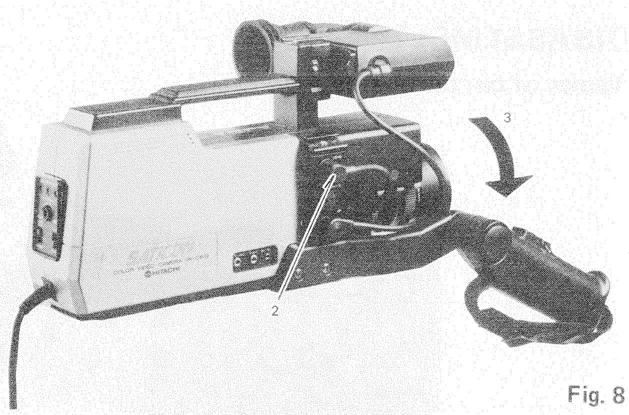


Fig. 8

5. Covers (Fig. 9)

1) Remove 2 screws.
2) Remove the covers in the direction of the arrow.

Note: The tabs are provided on the covers, so remove and reinstall both covers.

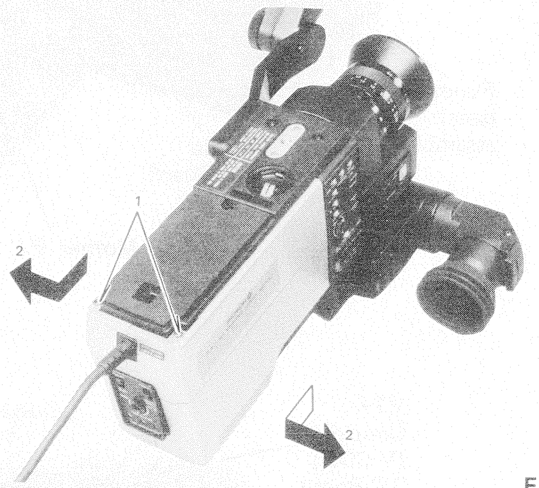


Fig. 9

6. Handle (Fig. 10)

1) Remove the lens.
2) Remove the cover.
3) Remove 3 screws.

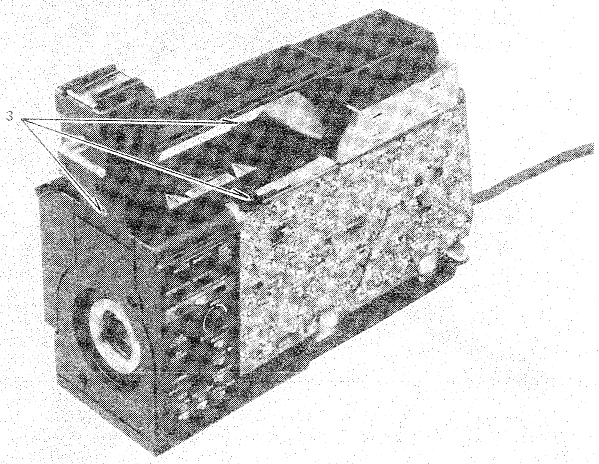


Fig. 10

2. Removing Circuit Boards

Disassemble the cases as previously given.

1. Vdieo circuit board. (Fig. 11, 12)

1) Remove 2 screws. (Fig. 11)
2) Unsolder the lead. (Fig. 11)

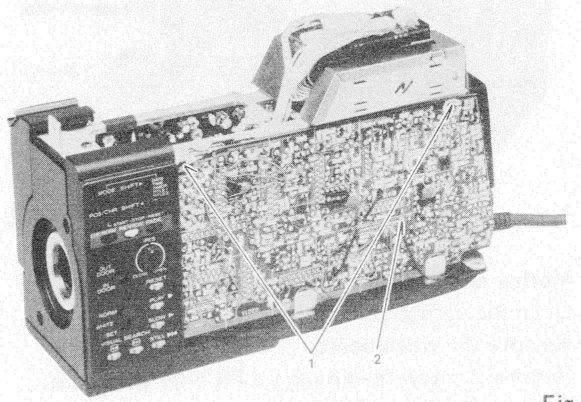


Fig. 11

3) Disconnect connectors CN1, CN2, CN3 and CN4. (Fig. 12)
4) Release the stoppers of the board hinges.

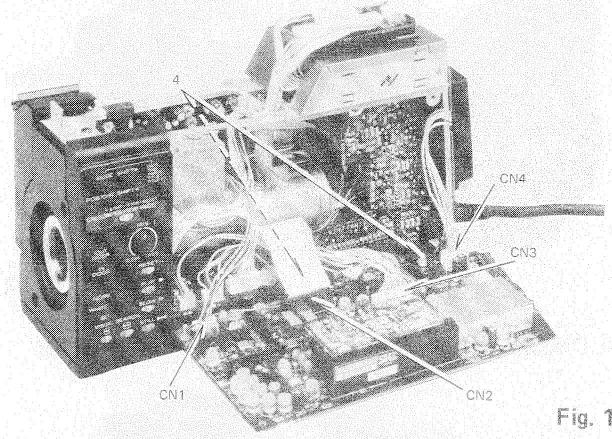


Fig. 12

2. Deflection circuit board (Fig. 13, 14, 15)

1) Remove 2 screws. (Fig. 13)

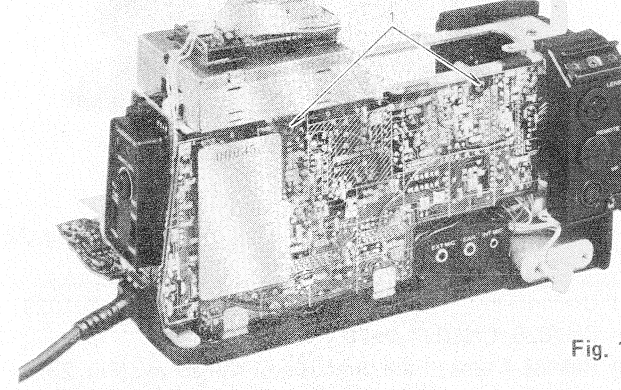


Fig. 13

2) Remove 2 screws. (Fig. 14)
3) Remove the SATICON socket shield plate in the direction of the arrow. (Fig. 14)

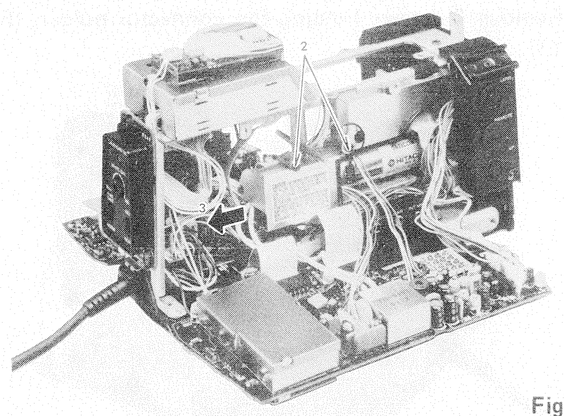


Fig. 14

4) Unsolder the lead. (Fig. 15)
5) Remove the SATICON socket in the direction of the arrow. (Fig. 15)
6) Disconnect connectors CN301 – CN303 and CN305 – CN307. (Fig. 15)

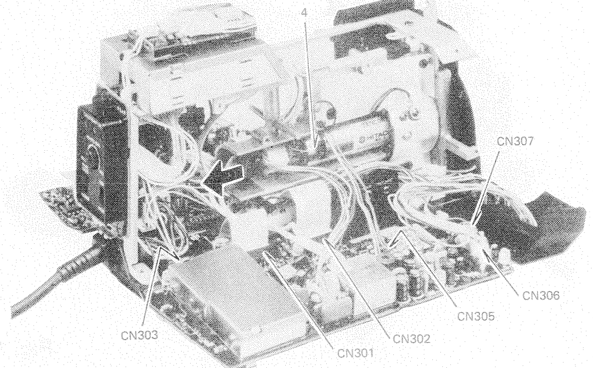


Fig. 15

3. Preamplifier circuit board (Fig. 16, 17, 18)

1) Open the video board and deflection board.
2) Disconnect connector CN1. (Fig. 16)

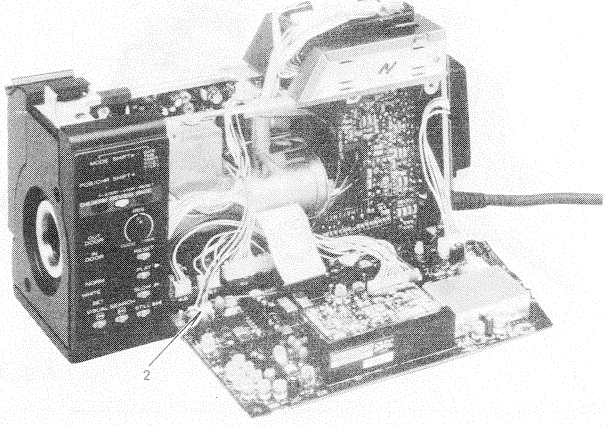


Fig. 16

3) Remove 2 screws holding the connector holder. (Fig. 17)

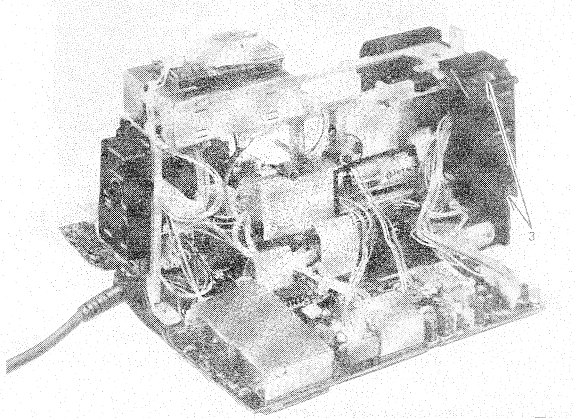


Fig. 17

4) Remove 5 screws and remove the shield. (Fig. 18)

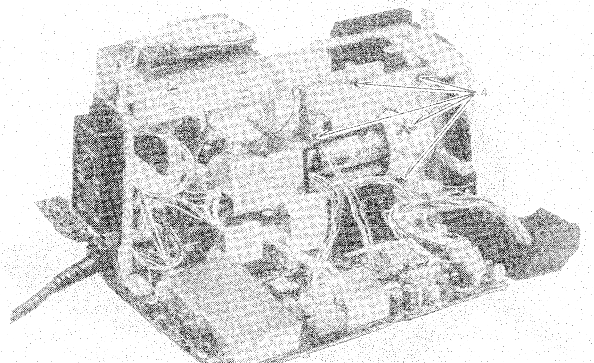


Fig. 18

5) Unsolder the target lead. (Fig. 19)
6) Remove 2 screws and remove the preamplifier in the direction of the arrow. (Fig. 19)

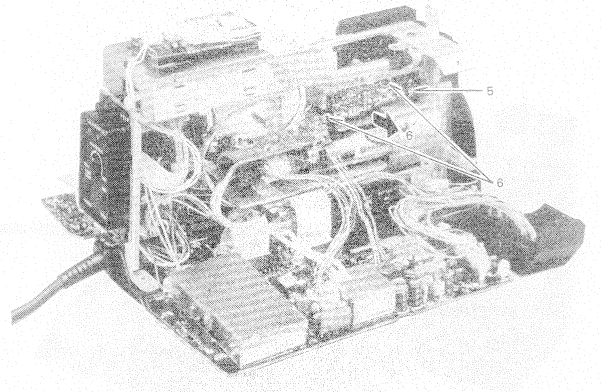


Fig. 19

4. VTR interface (V INT) circuit board (Fig. 20)

1) Open the video board.
2) Remove 1 screw.
3) Remove the V INT board in the direction of the arrow from CN1026.
4) Disconnect connectors CN605 – CN603 and CN601.

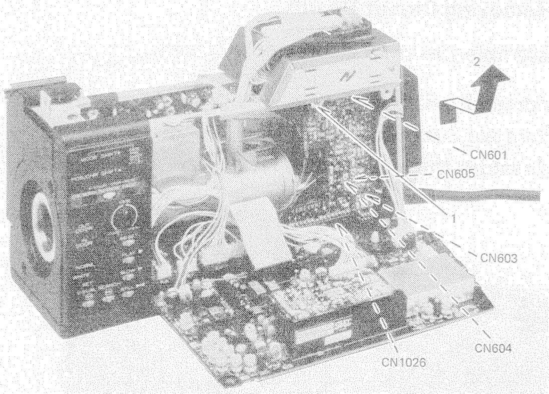


Fig. 20

5. Mother circuit board (Fig. 21, 22, 23)

1) Open the defliction board.
2) Remove the video board.
3) Remove 1 screw holding the VTR interface board.
4) Remove 3 screws. (Fig. 21)
5) Open the botton cover in the direction of the arrow. (Fig. 21)

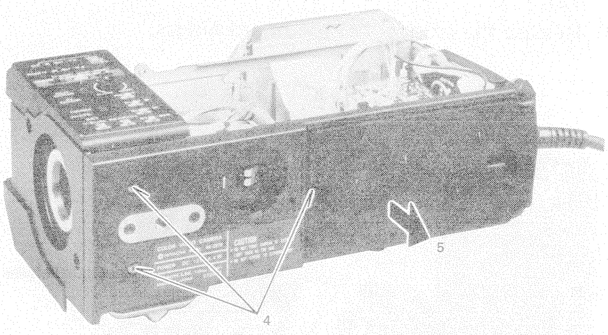


Fig. 21

6) Disconnect connectors CN302 and CN303. (Fig. 22)

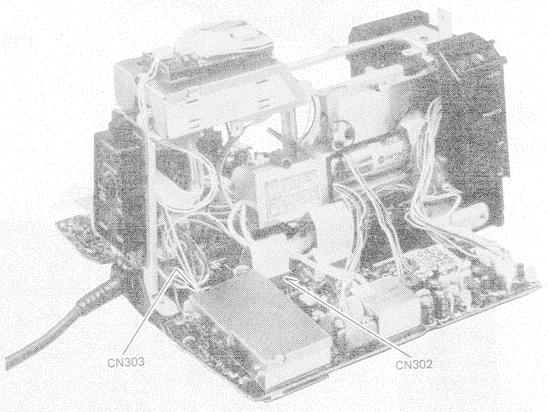


Fig. 22

7) Disconnect connectors CN953, CN1021 – CN1023, CN1026, CN1027 and CN1030. (Fig. 23)
8) Release 4 tabs in the direction of the arrow. (Fig. 23)
9) Unsolder the lead CN1023-2. (Fig. 23)

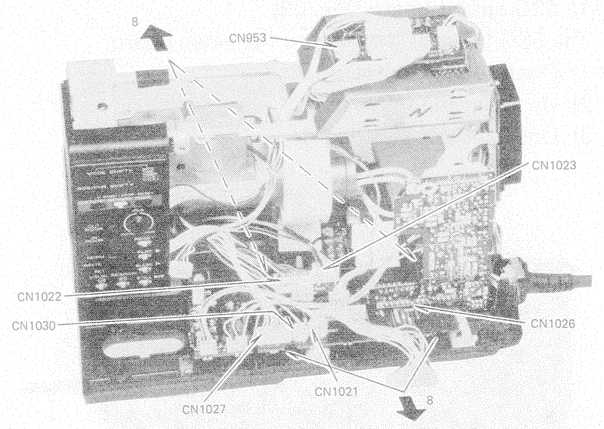

8
CN953
CN1023
CN1022
CN1030
CN1026
CN1021
8
CN1027

Fig. 23

6. Audio circuit board. (Fig. 24)

1) Open the defliction board.
2) Remove the video board.
3) Remove 1 screw holding the VTR interface board.
4) Remove 3 screws. (Fig. 21)
5) Open the bottom cover in the direction of the arrow. (Fig. 21)
6) Disconnect connector CN603 and CN1021. (Fig. 24)
7) Remove 1 screw. (Fig. 24)

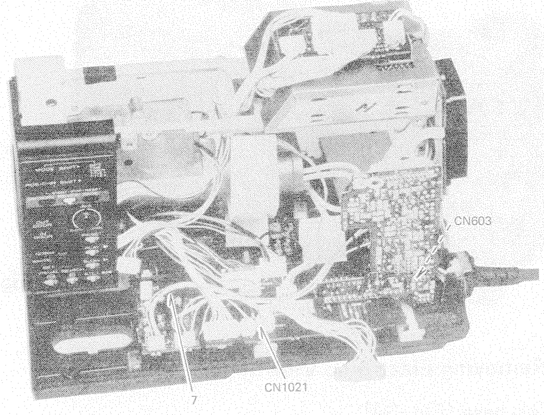

CN603
7
CN1021

Fig. 24

7. Zoom circuit board (Fig. 25, 26, 27)

1) Remove 3 screws. (Fig. 25)

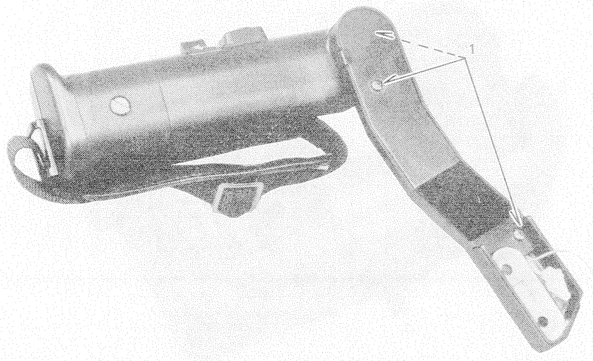


Fig. 25

2) Remove 2 screws. (Fig. 26)
3) Turn the screw to remove it (Fig. 26)

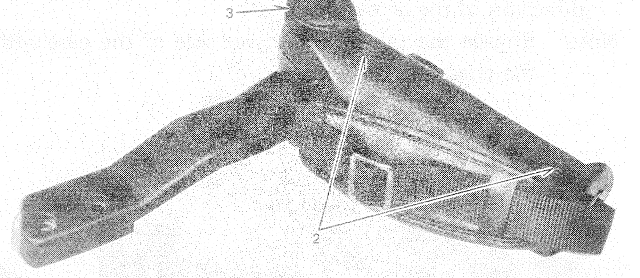


Fig. 26

4) Remove the zoom board in the direction of the arrow. (Fig. 27)

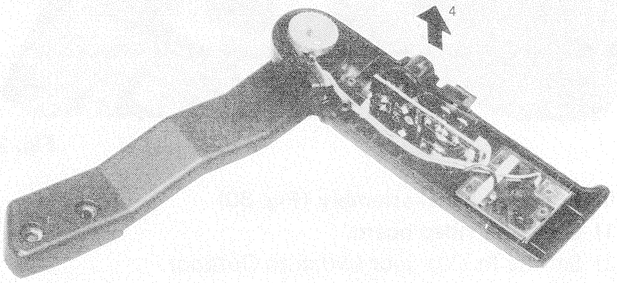


Fig. 27

8. μCOM-1/μCOM-2/VTR control circuit board (Fig. 28, 29)

1) Open the deflection board.
2) Disconnect connectors CN951 – CN954. (Fig. 28)
3) Push the VTR control board holder in the direction of the arrow. (Fig. 28)
4) Remove 1 screw and remove the cover in the direction of the arrow. (Fig. 28)
5) Disconnect connector CN601. (Fig. 28)

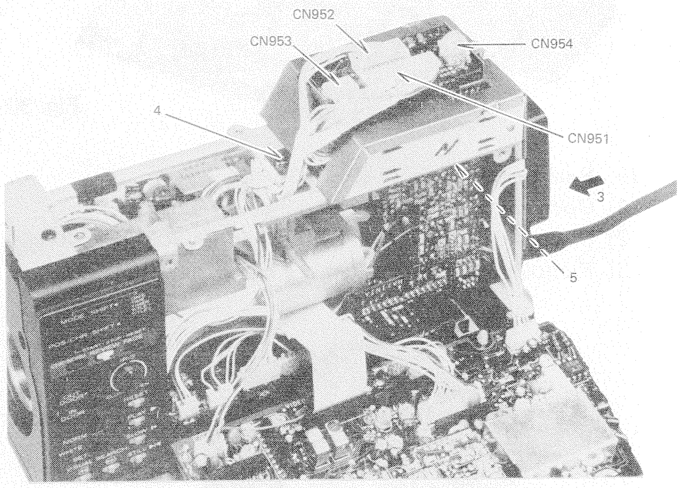

CN952
CN953
CN954
4
CN951
3
5

Fig. 28

6) Remove the μCOM-1 board and μCOM-2 board in the direction of the arrow. (Fig. 29)

Note: Engage the tab on the lower side of the case with the chassis when reinstalling.

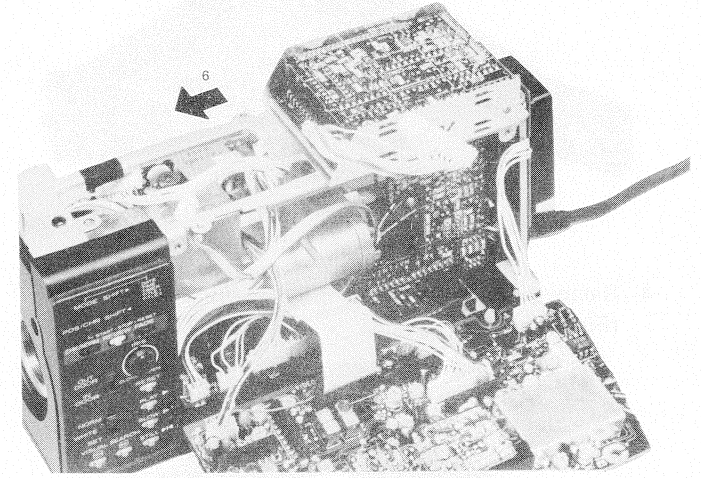


Fig. 29

9. Function panel assembly (Fig. 30)

1) Open the video board.
2) Set the In/Out door switch to Outdoor.
3) Remove 3 screws. (Fig. 30)
4) Disconnect connectors CN1027 and CN952. (Fig. 30)

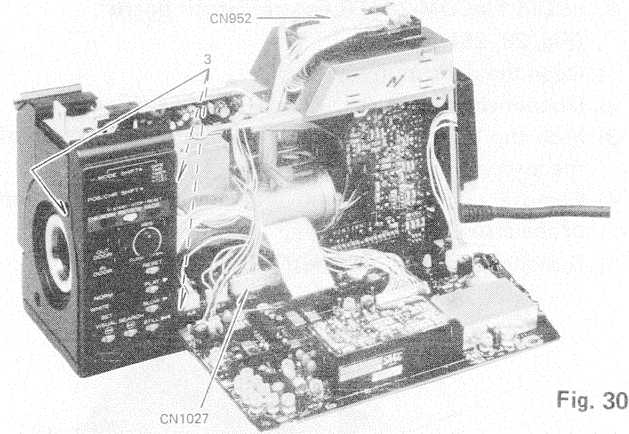


Fig. 30

10. Rear panel assembly (Fig. 31)

1) Open the video board and deflection board.
2) Disconnect connectors CN954 and CN303. (Fig. 31)
3) Remove 2 screws and remove rear panel. (Fig. 31)

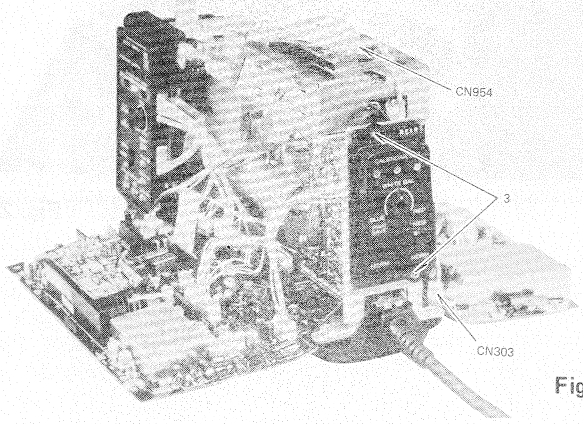


Fig. 31

11. SSG circuit board (Fig. 32)

The SSG board is soldered to the video board.

1) Open the video board.
2) Unsolder the shield cover.
3) Unsolder the SSG board.

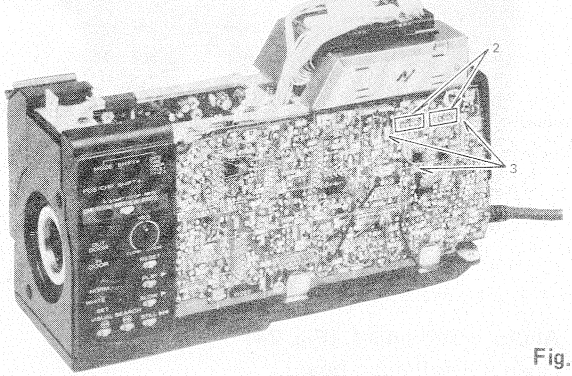


Fig. 32

12. Auto white circuit board (Fig. 33)

The auto white board is soldered to the video board.

1) Open the video board.
2) Unsolder the auto white board.

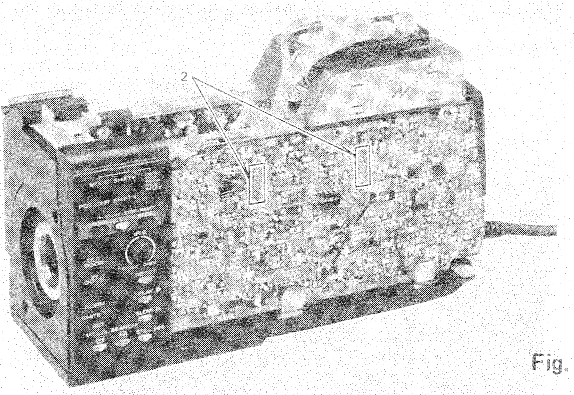


Fig. 33

3. Removing Electronic Viewfinder

1. Top case (Fig. 34)

1) Remove 3 screws. (Fig. 34)
2) Press the top cover to release the locking tab and gently pull apart and remove the top cover. (Fig. 34)

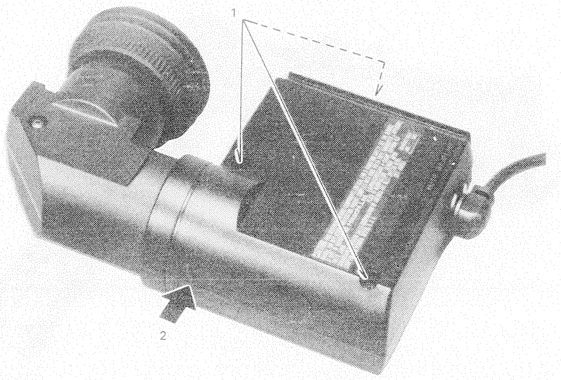


Fig. 34

2. Electronic viewfinder circuit board (EVF-1, EVF-2) (Fig. 35, 36)

1) Remove the top cover.
2) Remove the EVF-2 board in the direction of the arrow. (Fig. 35)

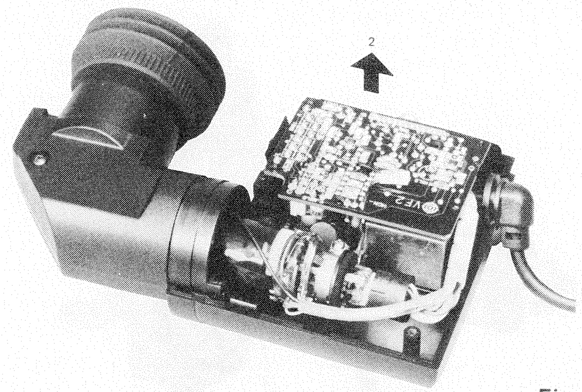


Fig. 35

3) Disconnect connectors CN1152 and CN1101. (Fig. 36)
4) Release 2 tabs in the direction of the arrow to remove the EVF-1 board. (Fig. 36)

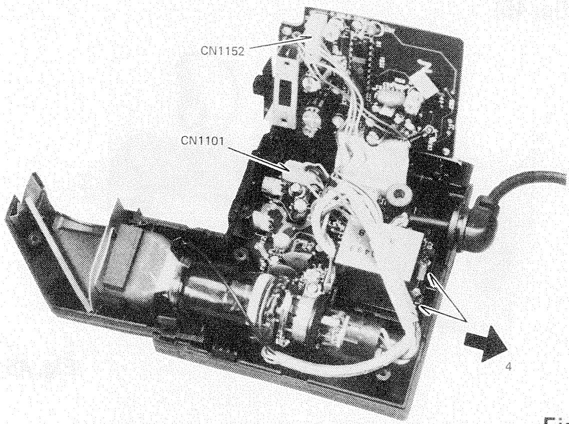


Fig. 36

3. CRT (Fig. 37, 38, 39)

1) Remove the top cover.
2) Remove 1 screw holding the neck cover. (Fig. 37)
3) Remove the EVF-2 board in the direction of the arrow. (Fig. 37)

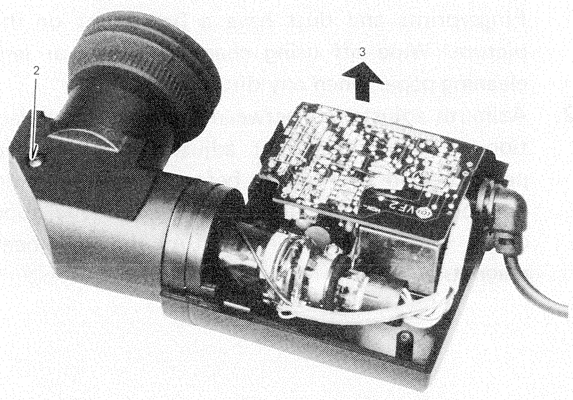


Fig. 37

4) Disconnect connector CN1152. (Fig. 38)
5) Release the lead wire holder. (Fig. 38)
6) Remove the CRT socket. (Fig. 38)
7) Remove the CRT assembly. (Fig. 38)

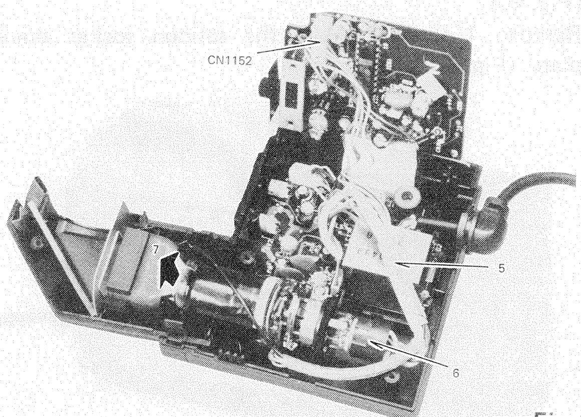


Fig. 38

8) Loose 1 screw and disconnect the CRT in the direction of the arrow. (Fig. 39)

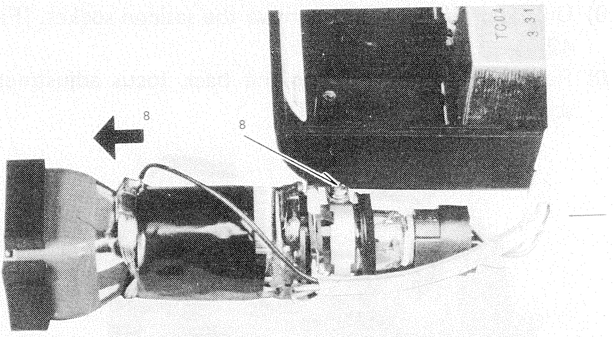


Fig. 39

4. Removing Camera Tube (SATICON)/Deflection Coil Assembly

Turn off the power before replacing this.
Disassemble the cases as previously given.

1) Open the video board and deflection board.
2) Remove the function panel assembly.
3) Disconnect connector CN305 and CN307. (Fig. 40)

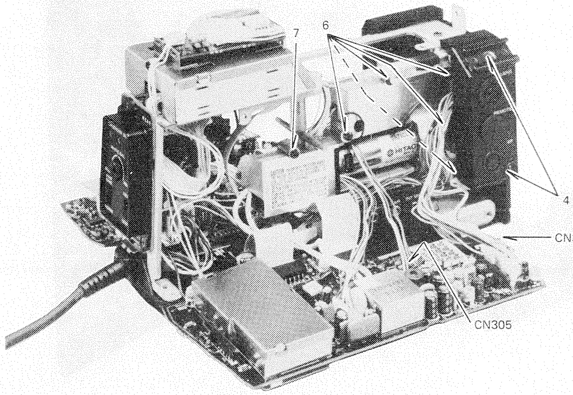


Fig. 40

4) Remove 2 screws holding the connector holder. (Fig. 40)
5) Remove 2 screws holding the front panel. (Fig. 41)
6) Remove 5 screws holding the preamplifier shield plate. (Fig. 40)
7) Remove 1 screw holding the saticon socket shield plate. (Fig. 40)

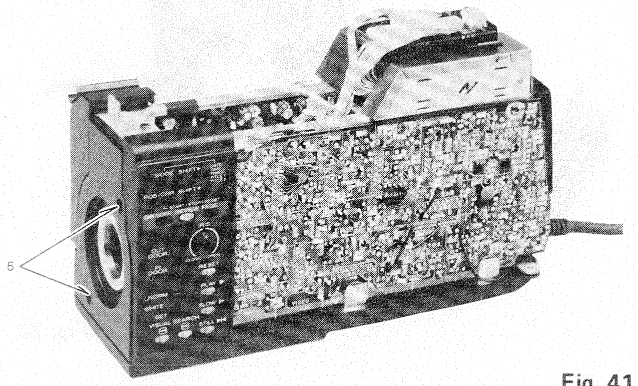


Fig. 41

8) Unsolder the target lead. (Fig. 42)
9) Unsolder the lead and remove the saticon socket. (Fig. 42)
10) Remove 1 screw holding the back focus adjustment screw holder. (Fig. 42)

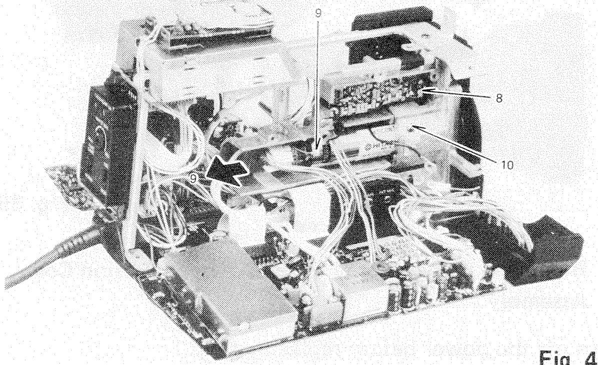


Fig. 42

11) Remove 4 screws holding the lens holder. (Fig. 43)

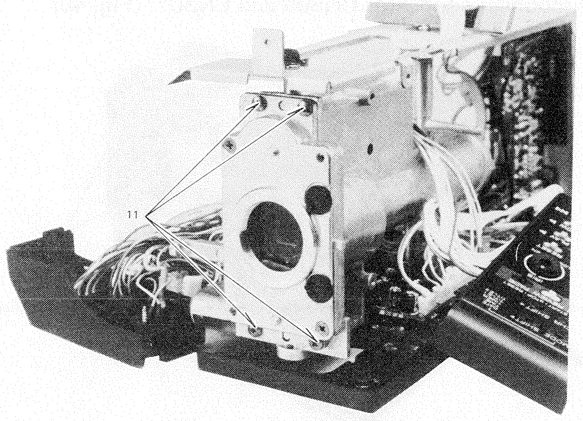


Fig. 43

12) Remove the back focus adjustment screw holder in the direction of the arrow. (Fig. 44)
13) Remove the back focus adjustment screw. (Fig. 44)
14) Remove the SATICON/deflection coil assembly in the direction of the arrow. (Fig. 44)

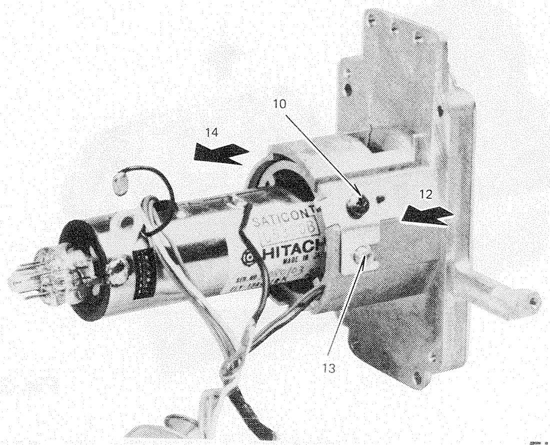


Fig. 44

15) Remove 2 screws holding the deflection coil holder. (Fig. 45)

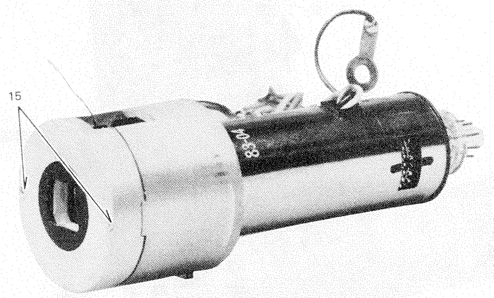


Fig. 45

16) Install by the reverse procedure to disassembly.
17) Perform adjustment after replacing the camera tube/coil ass'y.

Note:

1. Use gloves when replacing the camera tube/coil ass'y so that fingerprints and dust do not adhere to the surface or walls of the camera tube. Fingerprints and dust have a bad effect on the picture. Wipe off using chamois leather or lens cleaning paper when any dirt adheres.
2. Azimuth adjustment between the tube and deflection coil and alignment adjustment have been performed in the factory before shipment, so do not loosen the tube fixing screw or internal tube clamp screw and do not turn the alignment magnets.

5. Removing Lens

1. Lens hood (Fig. 46)

1) Turn to remove it.

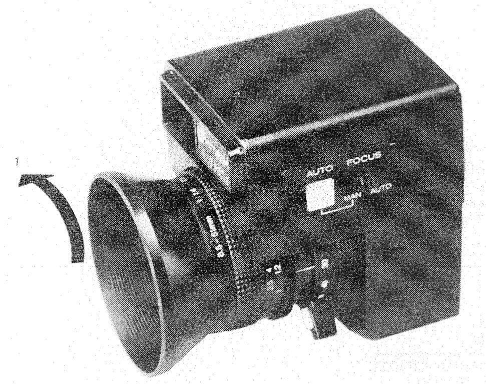

1
AUTO FOCUS
MAN AUTO

Fig. 46

2. Front cover (Fig. 47)

1) Remove 2 screws.
2) Loose 1 screw.

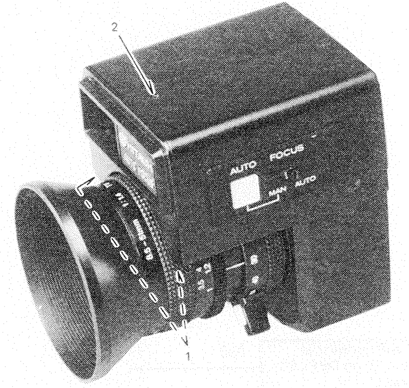

2
AUTO FOCUS
MAN AUTO
1

Fig. 47

3. Side covers (Fig. 48)

1) Remove 9 screws holding the side covers.
2) Remove the left cover in the direction of the arrow.
3) After removing the right cover in the direction of the arrow, release the cable holder from the cover and remove the cable in the direction of the arrow.

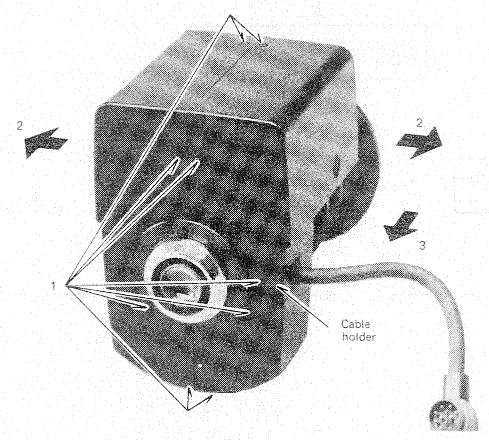

2
2
3
1
Cable holder

Fig. 48

4. Zoom motor (Fig. 49)

1) Remove 2 screws.
2) Unsolder the lead.

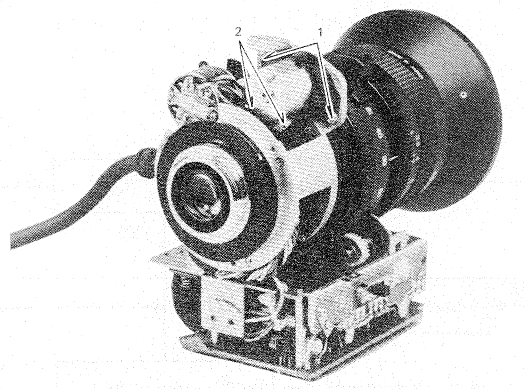


Fig. 49

5. Focus auto/manual switch (Fig. 50)

1) Remove 2 screws.
2) Unsolder the lead.

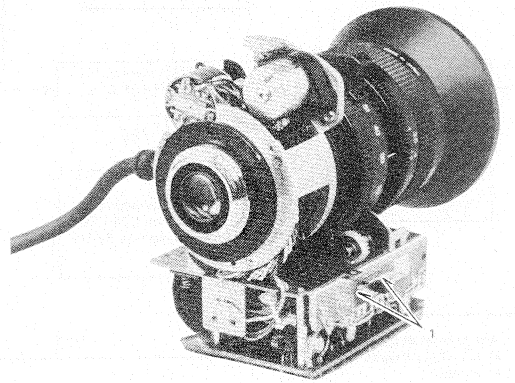


Fig. 50

MEMO

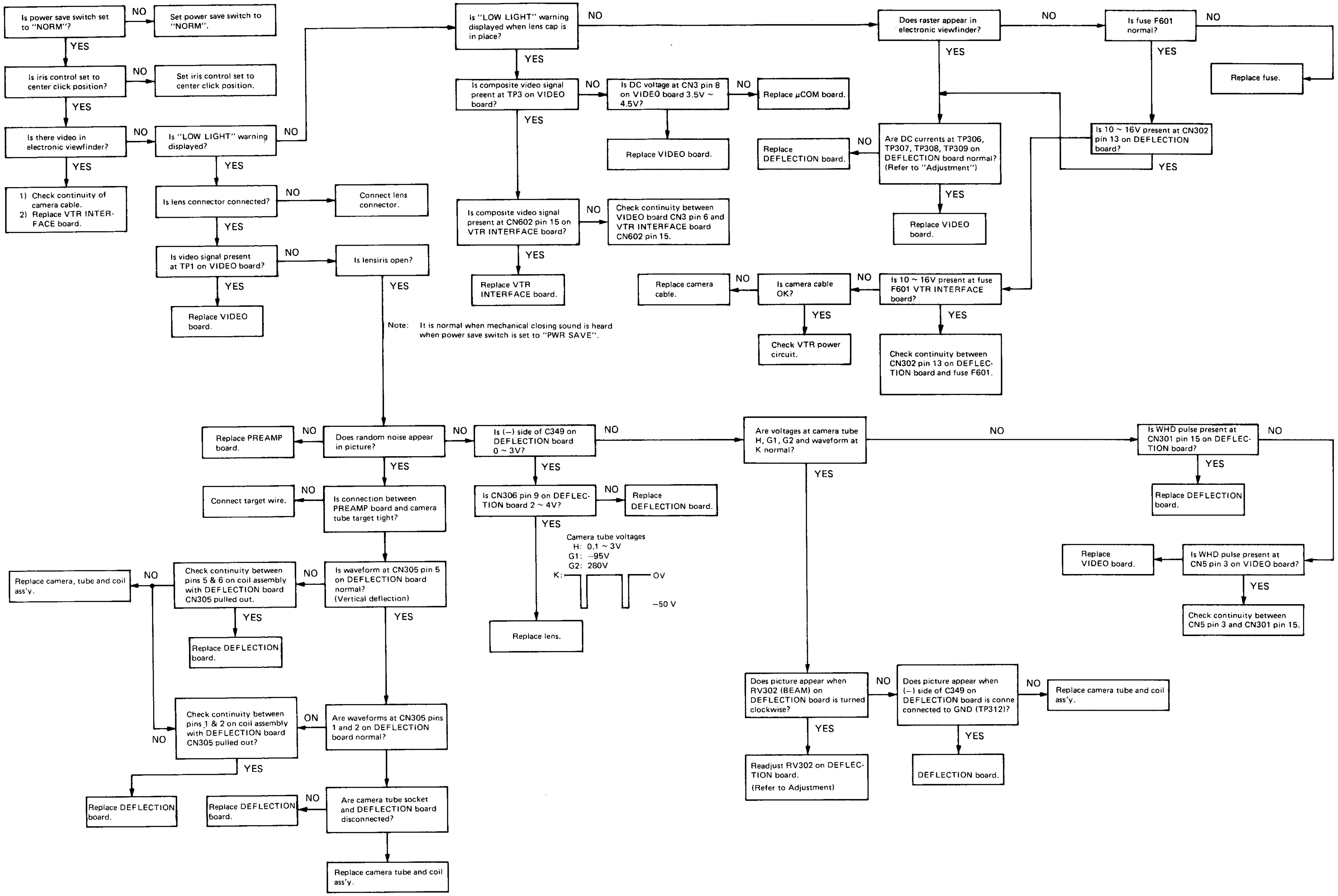
TROUBLESHOOTING

Check the following before checking the circuit

1) Connection of each connector and all operation switch positions.

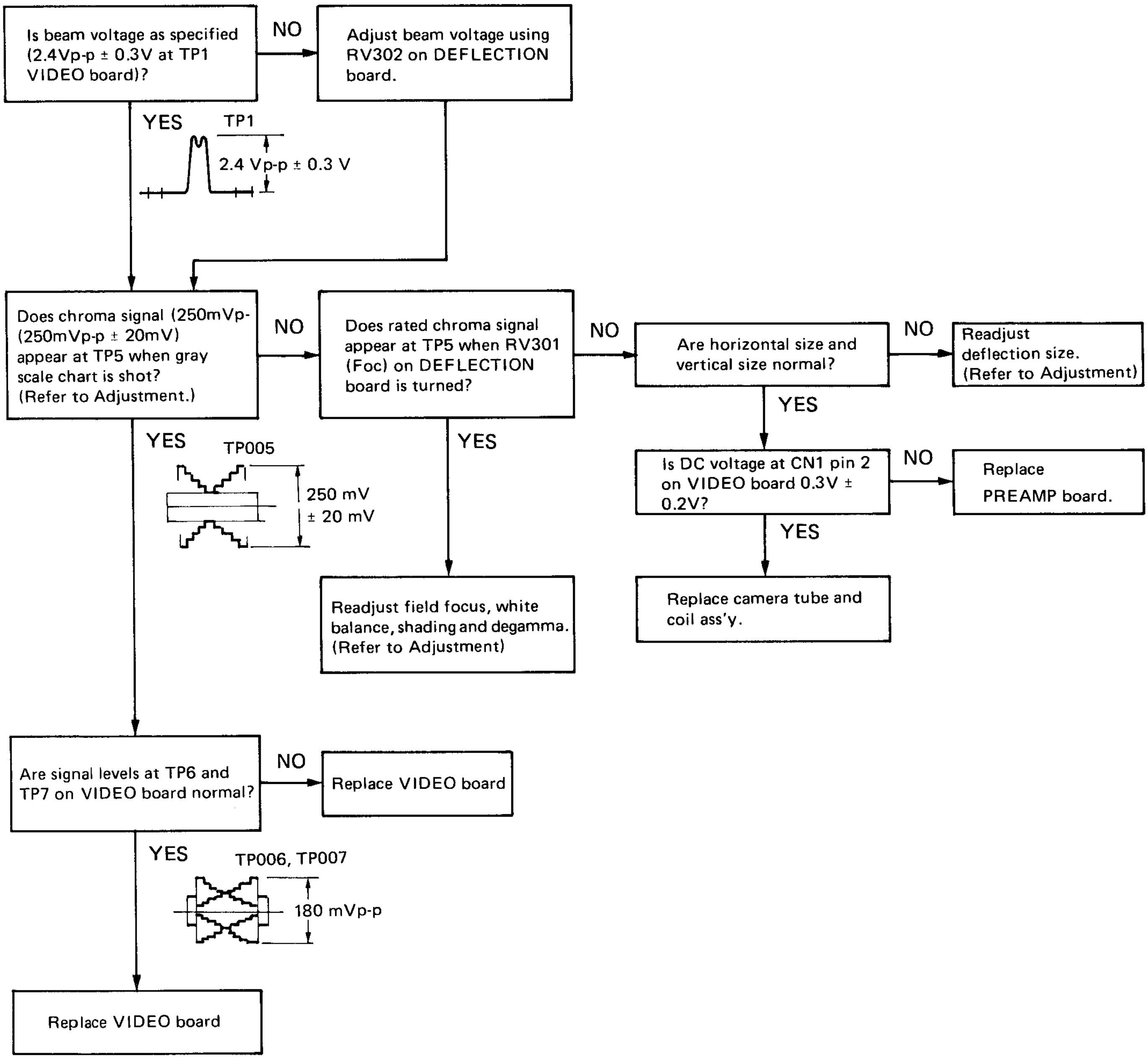
2) Power voltage supplied to camera.

1. No picture

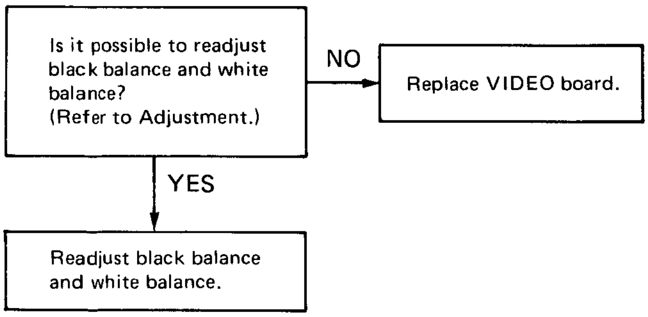

Is power save switch set to "NORM"?
NO
Set power save switch to "NORM".
YES
Is iris control set to center click position?
NO
Set iris control set to center click position.
YES
Is there video in electronic viewfinder?
NO
Is "LOW LIGHT" warning displayed?
NO
YES
1) Check continuity of camera cable.
2) Replace VTR INTERFACE board.
YES
Is lens connector connected?
NO
Connect lens connector.
YES
Is video signal present at TP1 on VIDEO board?
NO
Is lensiris open?
YES
Replace VIDEO board.
YES
Is "LOW LIGHT" warning displayed when lens cap is in place?
NO
YES
Is composite video signal prevent at TP3 on VIDEO board?
NO
Is DC voltage at CN3 pin 8 on VIDEO board 3.5V ~ 4.5V?
NO
Replace μCOM board.
Replace VIDEO board.
YES
Is composite video signal present at CN602 pin 15 on VTR INTERFACE board?
NO
Check continuity between VIDEO board CN3 pin 6 and VTR INTERFACE board CN602 pin 15.
YES
Replace VTR INTERFACE board.
Note: It is normal when mechanical closing sound is heard when power save switch is set to "PWR SAVE".
Does raster appear in electronic viewfinder?
NO
Is fuse F601 normal?
NO
Replace fuse.
YES
YES
Is 10 ~ 16V present at CN302 pin 13 on DEFLECTION board?
YES
Are DC currents at TP306, TP307, TP308, TP309 on DEFLECTION board normal? (Refer to "Adjustment")
NO
Replace DEFLECTION board.
YES
Replace VIDEO board.
Is 10 ~ 16V present at fuse F601 VTR INTERFACE board?
NO
Is camera cable OK?
NO
Replace camera cable.
YES
Check VTR power circuit.
YES
Check continuity between CN302 pin 13 on DEFLECTION board and fuse F601.
Does random noise appear in picture?
NO
Replace PREAMP board.
YES
Is connection between PREAMP board and camera tube target tight?
NO
Connect target wire.
Is waveform at CN305 pin 5 on DEFLECTION board normal? (Vertical deflection)
NO
Check continuity between pins 5 & 6 on coil assembly with DEFLECTION board CN305 pulled out.
NO
Replace camera, tube and coil ass'y.
YES
Replace DEFLECTION board.
YES
Are waveforms at CN305 pins 1 and 2 on DEFLECTION board normal?
ON
Check continuity between pins 1 & 2 on coil assembly with DEFLECTION board CN305 pulled out?
NO
YES
Replace DEFLECTION board.
Are camera tube socket and DEFLECTION board disconnected?
NO
Replace DEFLECTION board.
Replace camera tube and coil ass'y.
NO
Is (–) side of C349 on DEFLECTION board 0 ~ 3V?
NO
YES
Is CN306 pin 9 on DEFLECTION board 2 ~ 4V?
NO
Replace DEFLECTION board.
YES
Camera tube voltages
H: 0.1 ~ 3V
G1: –95V
G2: 280V
K:
0V
–50 V
Replace lens.
Are voltages at camera tube H, G1, G2 and waveform at K normal?
NO
Is WHD pulse present at CN301 pin 15 on DEFLECTION board?
NO
YES
Replace DEFLECTION board.
Is WHD pulse present at CN5 pin 3 on VIDEO board?
Replace VIDEO board.
YES
Check continuity between CN5 pin 3 and CN301 pin 15.
YES
Does picture appear when RV302 (BEAM) on DEFLECTION board is turned clockwise?
NO
Does picture appear when (–) side of C349 on DEFLECTION board is conne connected to GND (TP312)?
NO
Replace camera tube and coil ass'y.
YES
Readjust RV302 on DEFLECTION board. (Refer to Adjustment)
YES
DEFLECTION board.

2. Color reproduction poor

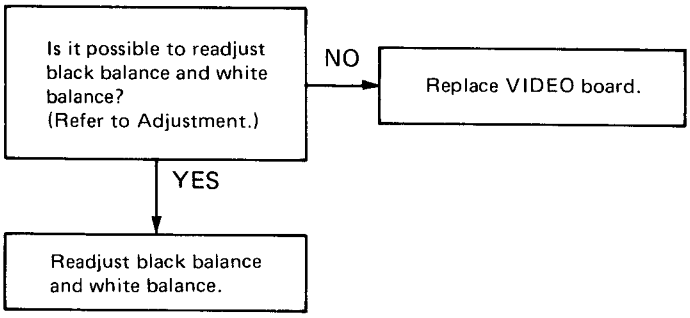
1-1. Greenish


Is beam voltage as specified (2.4Vp-p ± 0.3V at TP1 VIDEO board)?
NO
Adjust beam voltage using RV302 on DEFLECTION board.
YES
TP1
2.4 Vp-p ± 0.3 V
Does chroma signal (250mVp-(250mVp-p ± 20mV) appear at TP5 when gray scale chart is shot? (Refer to Adjustment.)
NO
Does rated chroma signal appear at TP5 when RV301 (Foc) on DEFLECTION board is turned?
NO
Are horizontal size and vertical size normal?
NO
Readjust deflection size. (Refer to Adjustment)
YES
Is DC voltage at CN1 pin 2 on VIDEO board 0.3V ± 0.2V?
NO
Replace PREAMP board.
YES
Replace camera tube and coil ass'y.
YES
Readjust field focus, white balance, shading and degamma. (Refer to Adjustment)
YES
TP005
250 mV
± 20 mV
Are signal levels at TP6 and TP7 on VIDEO board normal?
NO
Replace VIDEO board
YES
TP006, TP007
180 mVp-p
Replace VIDEO board

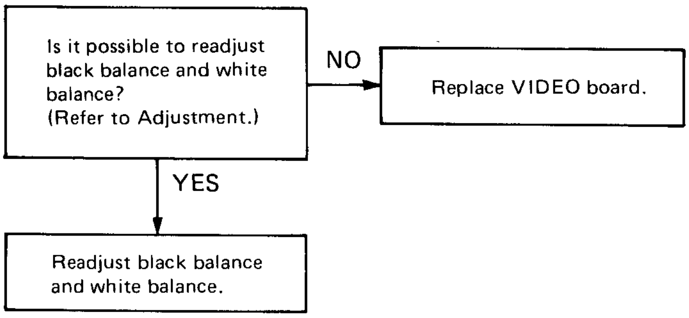
2-2. Picture greenish


Is it possible to readjust black balance and white balance? (Refer to Adjustment.)
NO
Replace VIDEO board.
YES
Readjust black balance and white balance.

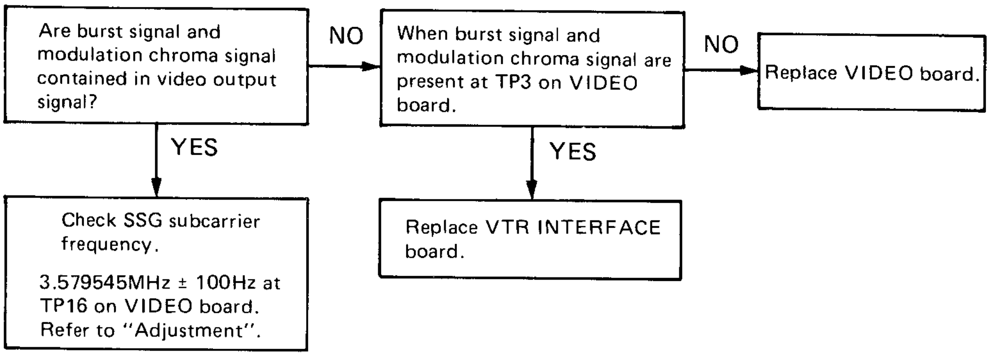
2-3. Picture reddish


Is it possible to readjust black balance and white balance? (Refer to Adjustment.)
NO
Replace VIDEO board.
YES
Readjust black balance and white balance.

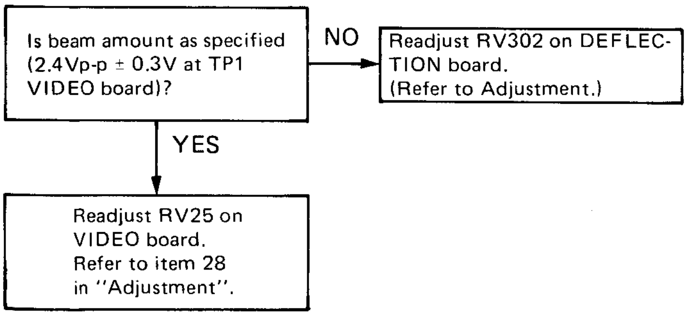
2-4. Picture bluish


Is it possible to readjust black balance and white balance? (Refer to Adjustment.)
NO
Replace VIDEO board.
YES
Readjust black balance and white balance.

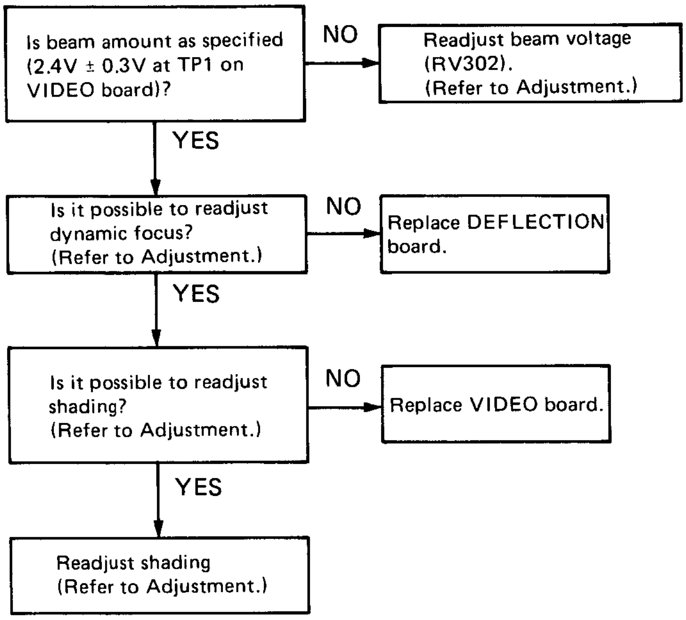
2-5. No color Colored too much


Are burst signal and modulation chroma signal contained in video output signal?
NO
When burst signal and modulation chroma signal are present at TP3 on VIDEO board.
NO
Replace VIDEO board.
YES
Replace VTR INTERFACE board.
YES
Check SSG subcarrier frequency.
3.579545MHz ± 100Hz at TP16 on VIDEO board. Refer to "Adjustment".

2-6. Highlight section greenish


Is beam amount as specified (2.4Vp-p ± 0.3V at TP1 VIDEO board)?
NO
Readjust RV302 on DEFLECTION board. (Refer to Adjustment.)
YES
Readjust RV25 on VIDEO board. Refer to item 28 in "Adjustment".

2-7. Color unevenness too much

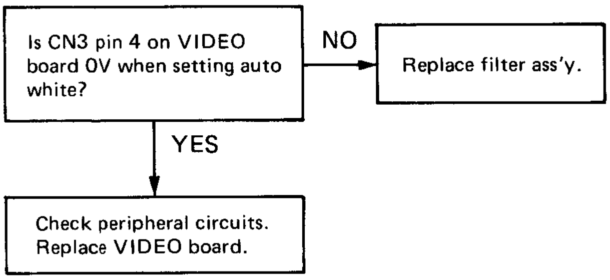

Is beam amount as specified (2.4V ± 0.3V at TP1 on VIDEO board)?
NO
Readjust beam voltage (RV302). (Refer to Adjustment.)
YES
Is it possible to readjust dynamic focus? (Refer to Adjustment.)
NO
Replace DEFLECTION board.
YES
Is it possible to readjust shading? (Refer to Adjustment.)
NO
Replace VIDEO board.
YES
Readjust shading (Refer to Adjustment.)

3. White balance correction not possible

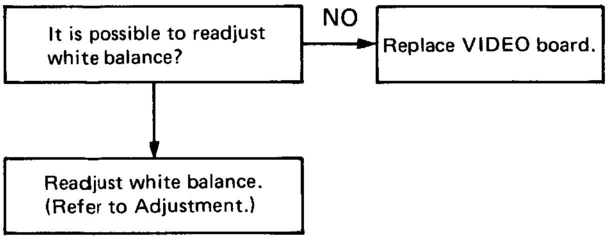
3-1. Tint does not change with position of Indoor/Outdoor switch changed?

Replace filter ass'y.

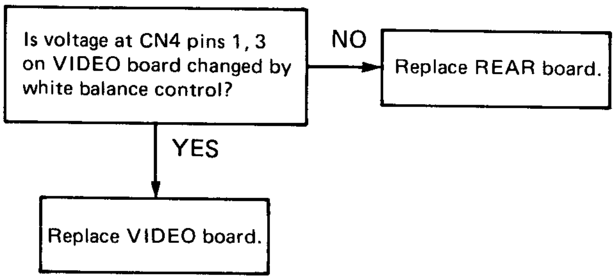
3-2. Auto white set does not operate


Is CN3 pin 4 on VIDEO board 0V when setting auto white?
NO
Replace filter ass'y.
YES
Check peripheral circuits. Replace VIDEO board.

3-3. White balance drifts when auto white is set


It is possible to readjust white balance?
NO
Replace VIDEO board.
Readjust white balance. (Refer to Adjustment.)

3-4. Tint does not change with white balance control turned


Is voltage at CN4 pins 1, 3 on VIDEO board changed by white balance control?
NO
Replace REAR board.
YES
Replace VIDEO board.

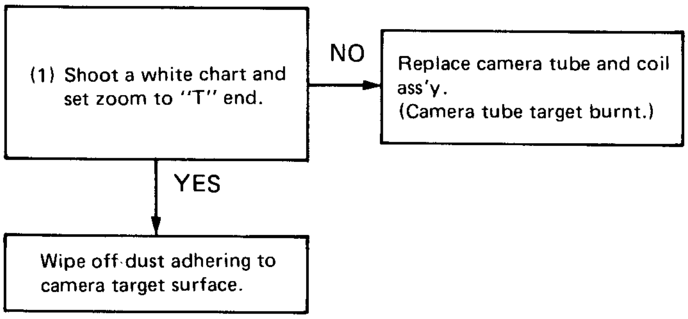
4. Picture missing in horizontal direction

Readjust RV304 on
DEFLECTION board.
(Refer to Adjustment.)

5. Picture missing in vertical direction

Readjust RV306 on
DEFLECTION board.
(Refer to Adjustment.)

6. Abnormal black spot is seen in picture


(1) Shoot a white chart and set zoom to "T" end.
NO
Replace camera tube and coil ass'y.
(Camera tube target burnt.)
YES
Wipe off dust adhering to camera target surface.

- How to discriminate when dust adheres to the camera tube surface

  Dust adhering to the tube surface and scratches (including burn) on the pick-up surface of the camera tube are seen very similar on the TV screen. How to discriminate them is shown in the table.
  Shoot a white chart (or very bright light colored object, etc.)
  When a black or white dot or line adheres in a fixed point on the monitor screen and it does not move to another position when the camera is moved, it is considered to be dust or a scratch (including burn).

How to discriminate dust:

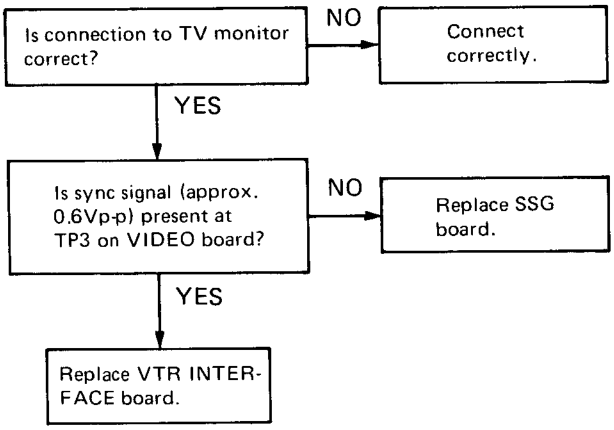
Gradually turn iris control knob in the direction of "CLOSED" to darken the screen. When the noise (dirt) becomes clearer and smaller, and becomes shaded and larger when the screen is returned to the original brightness, it is dust.

How to discriminate scratches and burn:

When the iris control knob is turned to make the screen dark but the shading size of the noise on the screen does not change, it is considered to be scratches or burn.

- Removing dust
  Remove the lens and clean the pick-up surface of the SATICON using cleaning bar (cotton bud).
  (Refer to "Disassembly")
  Note: The position of dust on the TV screen and the position of dust with the camera tube viewed from the front have point symmetry (because the picture on the monitor is in reverse to the actual picture).

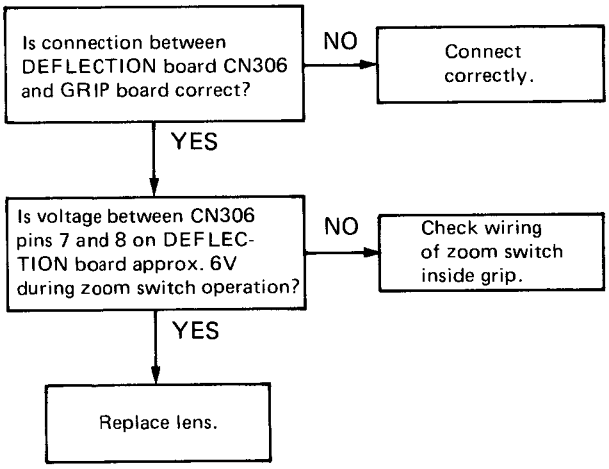
7. Sync distortion


Is connection to TV monitor correct?
NO
Connect correctly.
YES
Is sync signal (approx. 0.6Vp-p) present at TP3 on VIDEO board?
NO
Replace SSG board.
YES
Replace VTR INTERFACE board.

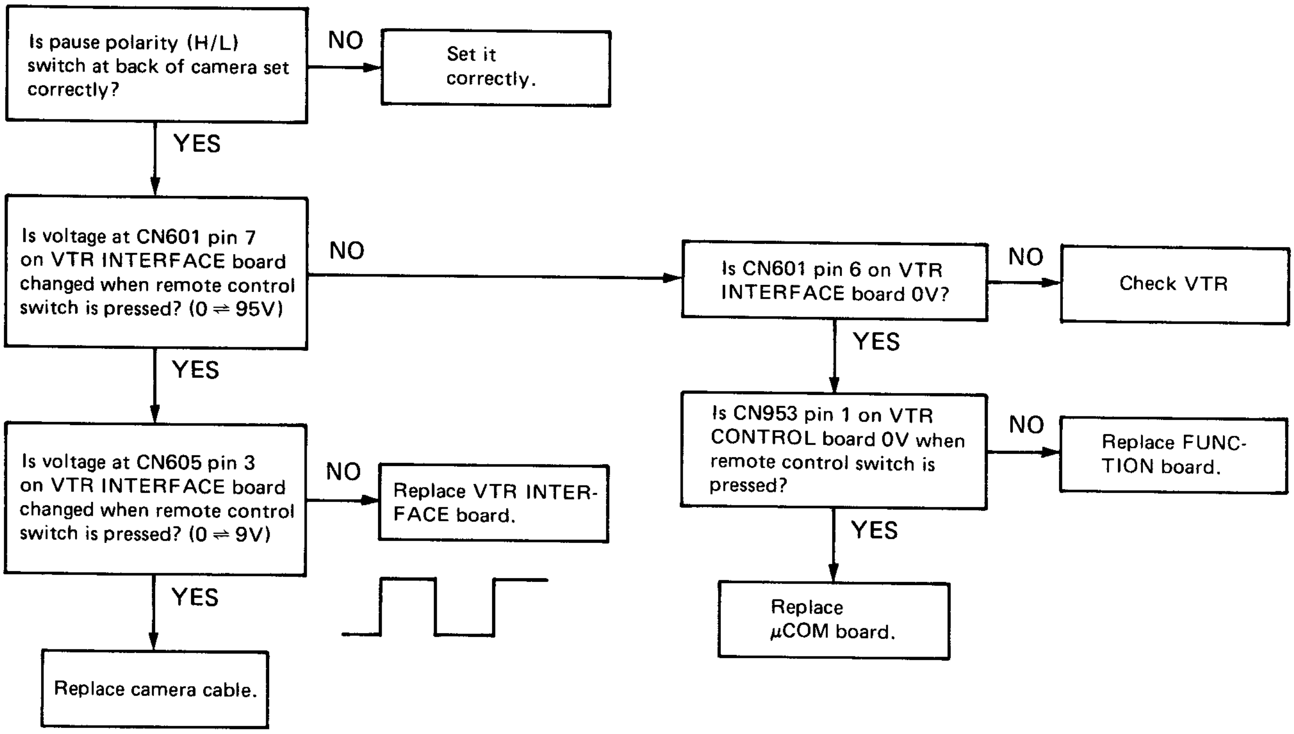
8. Picture smearing

Readjust CV501 (SMEAR) on PREAMP board.
(Refer to Adjustment.)

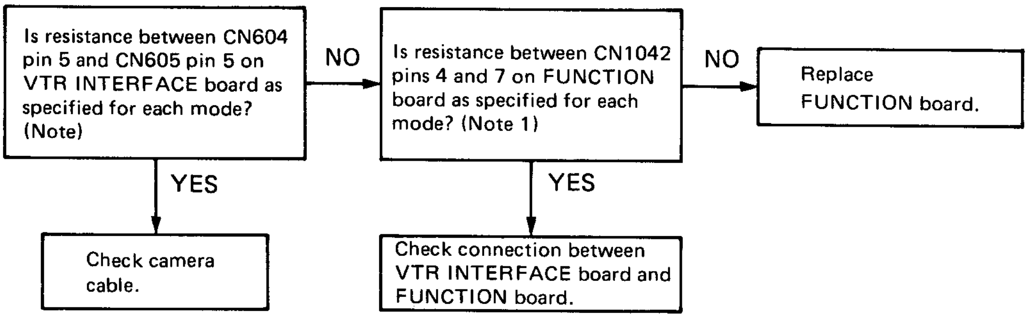
9. Power zoom does not operate


Is connection between DEFLECTION board CN306 and GRIP board correct?
NO
Connect correctly.
YES
Is voltage between CN306 pins 7 and 8 on DEFLECTION board approx. 6V during zoom switch operation?
NO
Check wiring of zoom switch inside grip.
YES
Replace lens.

10. Trigger button of camera does not operate normally with VTR set to record mode


Is pause polarity (H/L) switch at back of camera set correctly?
NO
Set it correctly.
YES
Is voltage at CN601 pin 7 on VTR INTERFACE board changed when remote control switch is pressed? (0 ⇌ 95V)
NO
Is CN601 pin 6 on VTR INTERFACE board 0V?
NO
Check VTR
YES
Is CN953 pin 1 on VTR CONTROL board 0V when remote control switch is pressed?
NO
Replace FUNCTION board.
YES
Replace μCOM board.
YES
Is voltage at CN605 pin 3 on VTR INTERFACE board changed when remote control switch is pressed? (0 ⇌ 9V)
NO
Replace VTR INTERFACE board.
YES
Replace camera cable.

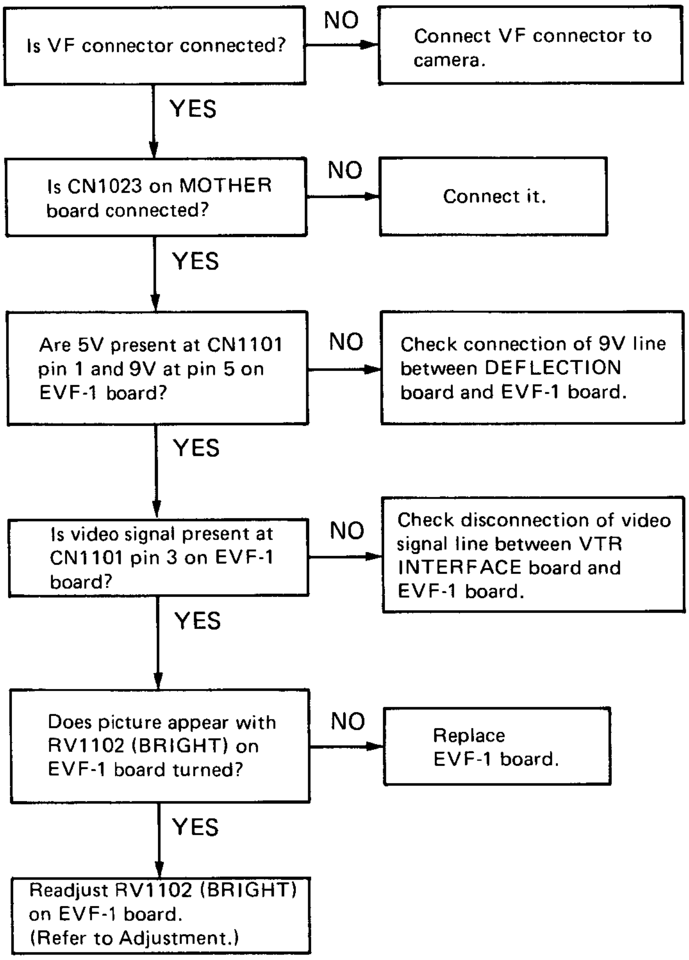
11. Remote control does not operate properly when combined with remote control VTR


Is resistance between CN604 pin 5 and CN605 pin 5 on VTR INTERFACE board as specified for each mode? (Note)
NO
Is resistance between CN1042 pins 4 and 7 on FUNCTION board as specified for each mode? (Note 1)
NO
Replace FUNCTION board.
YES
Check connection between VTR INTERFACE board and FUNCTION board.
YES
Check camera cable.

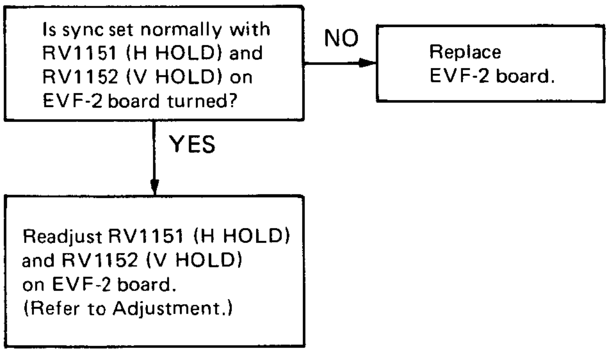
Note) Specified value in each VTR remote control mode

Mode	STILL	REVIEW	REV VISUAL SEARCH	FWD VISUAL SEARCH	SLOW	RESET	PLAY
Resistance (Ω)	0	660	6430	8530	15430	51430	111430

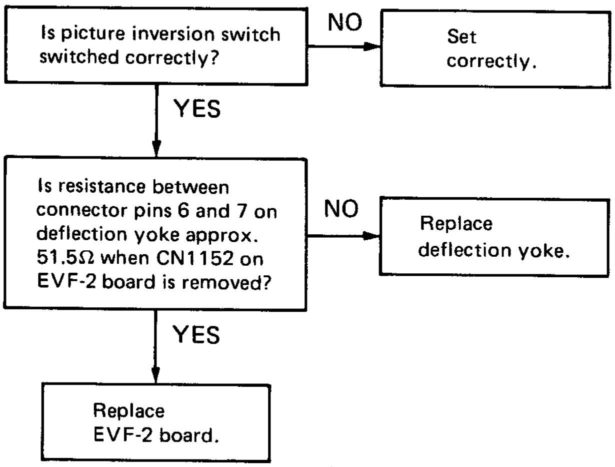
12. No picture in electronic viewfinder


Is VF connector connected?
NO
Connect VF connector to camera.
YES
Is CN1023 on MOTHER board connected?
NO
Connect it.
YES
Are 5V present at CN1101 pin 1 and 9V at pin 5 on EVF-1 board?
NO
Check connection of 9V line between DEFLECTION board and EVF-1 board.
YES
Is video signal present at CN1101 pin 3 on EVF-1 board?
NO
Check disconnection of video signal line between VTR INTERFACE board and EVF-1 board.
YES
Does picture appear with RV1102 (BRIGHT) on EVF-1 board turned?
NO
Replace EVF-1 board.
YES
Readjust RV1102 (BRIGHT) on EVF-1 board. (Refer to Adjustment.)

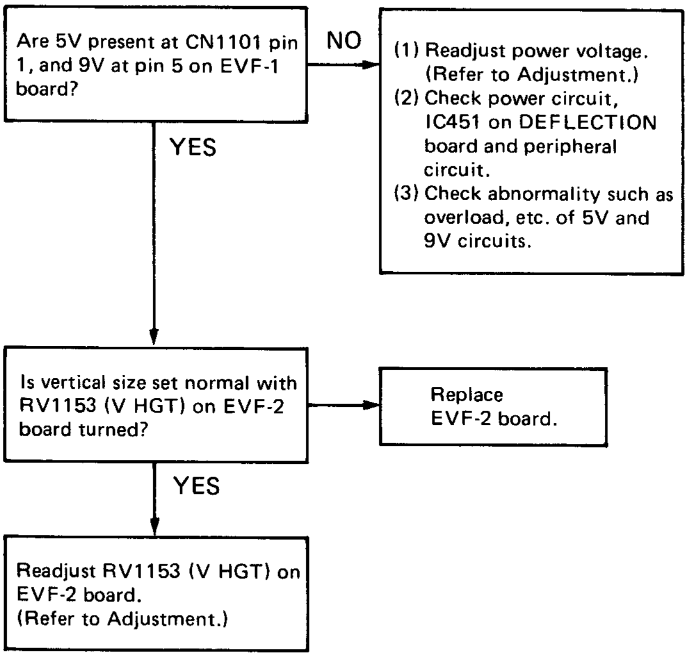
13. Electronic viewfinder sync distortion


Is sync set normally with RV1151 (H HOLD) and RV1152 (V HOLD) on EVF-2 board turned?
NO
Replace EVF-2 board.
YES
Readjust RV1151 (H HOLD) and RV1152 (V HOLD) on EVF-2 board. (Refer to Adjustment.)

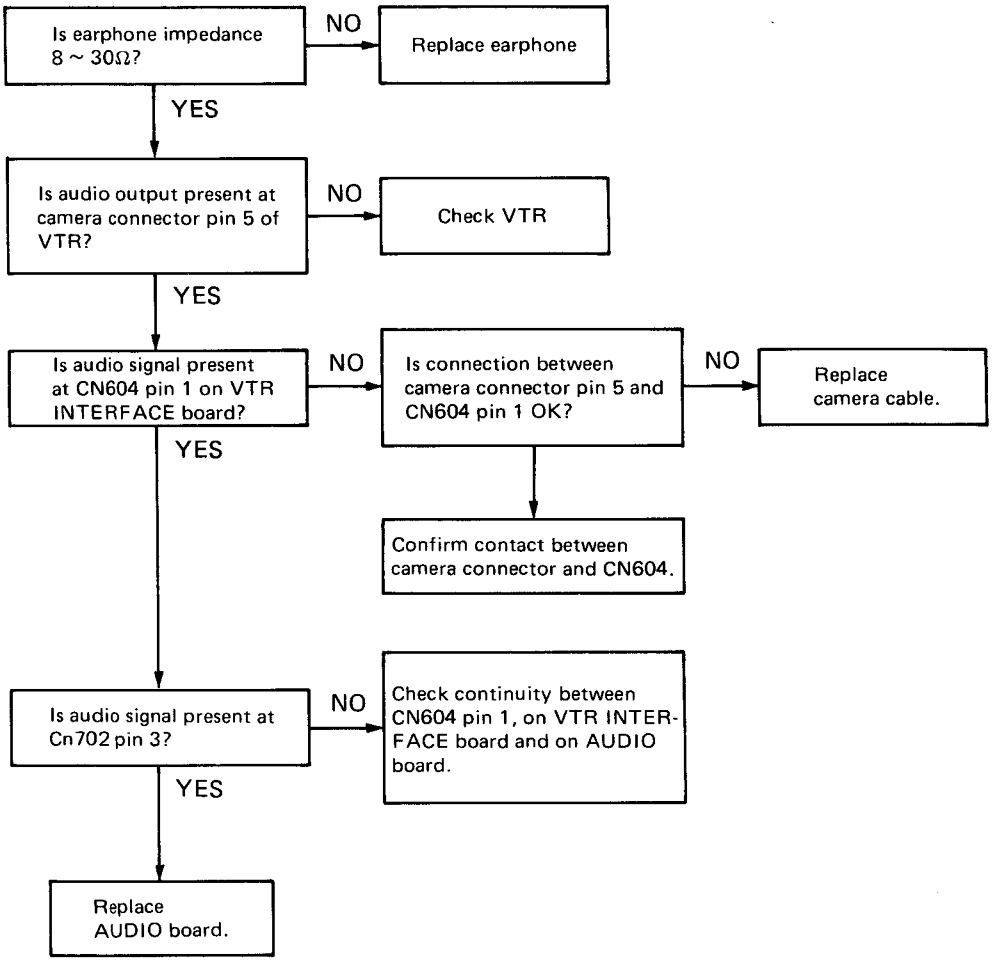
14. Picture in electronic viewfinder becomes a single lateral line


Is picture inversion switch switched correctly?
NO
Set correctly.
YES
Is resistance between connector pins 6 and 7 on deflection yoke approx. 51.5Ω when CN1152 on EVF-2 board is removed?
NO
Replace deflection yoke.
YES
Replace EVF-2 board.

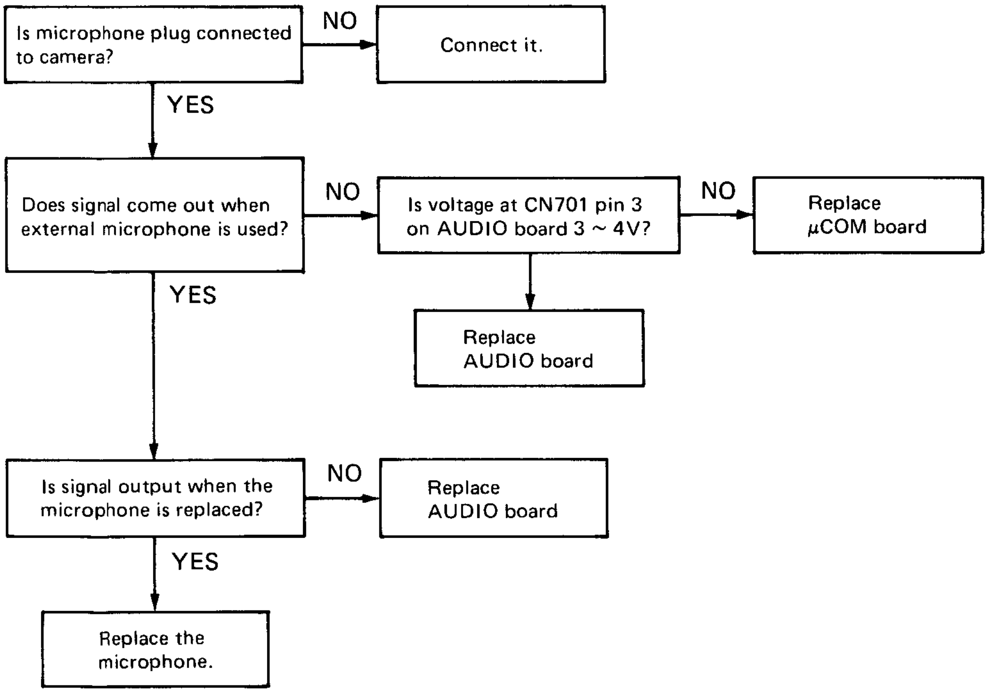
15. Vertical size of picture in electronic viewfinder shrinks


Are 5V present at CN1101 pin 1, and 9V at pin 5 on EVF-1 board?
NO
(1) Readjust power voltage. (Refer to Adjustment.)
(2) Check power circuit, IC451 on DEFLECTION board and peripheral circuit.
(3) Check abnormality such as overload, etc. of 5V and 9V circuits.
YES
Is vertical size set normal with RV1153 (V HGT) on EVF-2 board turned?
Replace EVF-2 board.
YES
Readjust RV1153 (V HGT) on EVF-2 board. (Refer to Adjustment.)

16. Audio monitoring is not possible via earphone jack on camera

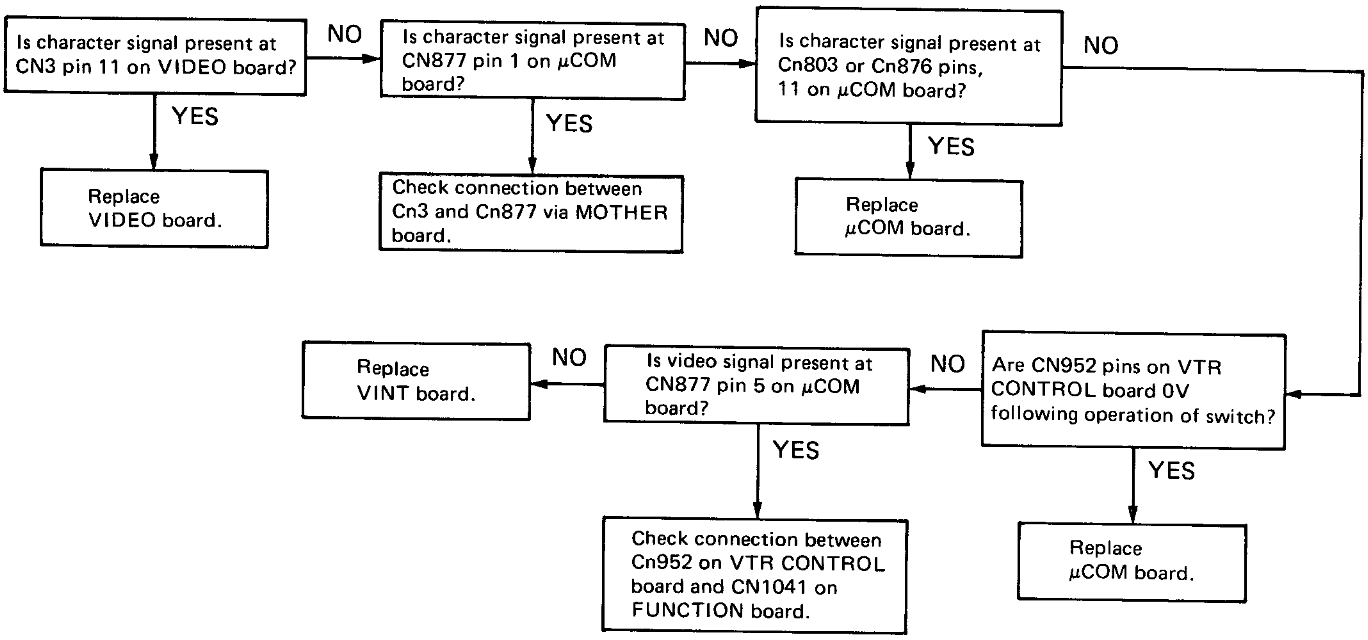

Is earphone impedance 8 ~ 30Ω?
NO
Replace earphone
YES
Is audio output present at camera connector pin 5 of VTR?
NO
Check VTR
YES
Is audio signal present at CN604 pin 1 on VTR INTERFACE board?
NO
Is connection between camera connector pin 5 and CN604 pin 1 OK?
NO
Replace camera cable.
Confirm contact between camera connector and CN604.
YES
Is audio signal present at Cn702 pin 3?
NO
Check continuity between CN604 pin 1, on VTR INTERFACE board and on AUDIO board.
YES
Replace AUDIO board.

17. No sound


Is microphone plug connected to camera?
NO
Connect it.
YES
Does signal come out when external microphone is used?
NO
Is voltage at CN701 pin 3 on AUDIO board 3 ~ 4V?
NO
Replace μCOM board
Replace AUDIO board
YES
Is signal output when the microphone is replaced?
NO
Replace AUDIO board
YES
Replace the microphone.

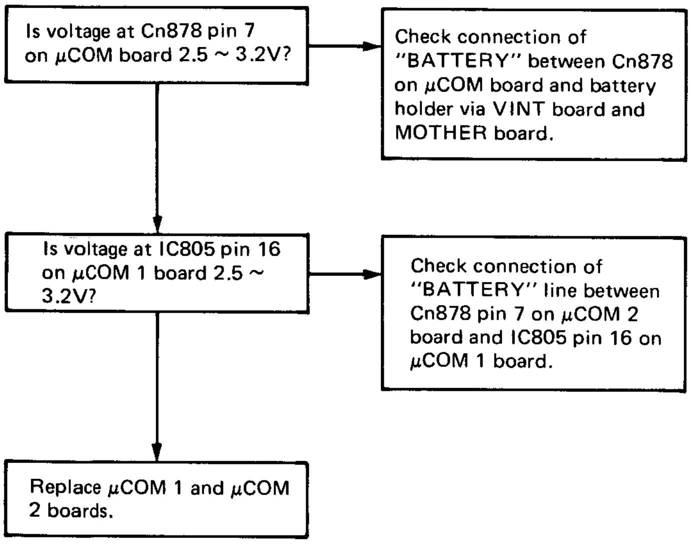
18. Character display defective

18-1. No character signal in video output


Is character signal present at CN3 pin 11 on VIDEO board?
NO
YES
Replace VIDEO board.
Is character signal present at CN877 pin 1 on μCOM board?
NO
YES
Check connection between Cn3 and Cn877 via MOTHER board.
Is character signal present at Cn803 or Cn876 pins, 11 on μCOM board?
NO
YES
Replace μCOM board.
Replace VINT board.
NO
Is video signal present at CN877 pin 5 on μCOM board?
NO
Are CN952 pins on VTR CONTROL board 0V following operation of switch?
YES
Check connection between Cn952 on VTR CONTROL board and CN1041 on FUNCTION board.
YES
Replace μCOM board.

18-2. Clook function does not work

* Confirm voltage of unassembled battery before checking.
(When it is 1.2 to 1.6V for each battery, it is normal)


Is voltage at Cn878 pin 7 on μCOM board 2.5 ~ 3.2V?
Check connection of "BATTERY" between Cn878 on μCOM board and battery holder via VINT board and MOTHER board.
Is voltage at IC805 pin 16 on μCOM 1 board 2.5 ~ 3.2V?
Check connection of "BATTERY" line between Cn878 pin 7 on μCOM 2 board and IC805 pin 16 on μCOM 1 board.
Replace μCOM 1 and μCOM 2 boards.

ADJUSTMENT

CONTENTS

ADJUSTING PARTS ABBREVIATION LIST . . 26

BEFORE STARTING ADJUSTMENT 27

ADJUSTMENTS

1. Adjustment after replacing camera tube/coil ass'y

1. Beam voltage adjustment 27
2. Back-focus adjustment 28
3. Horizontal size/linearity/centering adjustment . . . 28
4. Vertical size/centering adjustment 29
5. Bias light adjustment 29
6. Pulse canceller adjustment. 30
7. Dark shading adjustment. 30
8. Y setup adjustment 30
9. Edge balance adjustment. 30
10. Video level adjustment 31
11. Field focus adjustment 31
12. Chroma carrier level adjustment 32
13. Color separation adjustment 32
14. Black balance adjustment 32
15. White balance adjustment 32
16. Dynamic focus adjustment 33
17. Red/modulation shading adjustment 33
18. Blue/modulation shading adjustment. 34
19. White balance readjustment. 34
20. De-γ (Degamma) adjustment. 35
21. Chroma gain, burst level adjustment 35
22. Red phase adjustment 35
23. Smear adjustment 35

2. Adjustment after replacing video circuit board

1. Sub-carrier frequency adjustment. 36
2. PLL adjustment 36
3. Pulse canceller adjustment. 36
4. Dark shading adjustment. 36
5. Y setup adjustment 36
6. Edge balance adjustment. 36
7. Video level adjustment 37
8. Chroma carrier level adjustment. 37
9. Color separation adjustment 37
10. Black balance adjustment 38
11. White balance adjustment 38
12. De-γ (Degamma) adjustment. 38
13. Vertical false signal elimination adjustment 39
14. Chroma gain, burst level adjustment 39
15. Red phase adjustment 39
16. Auto white preset adjustment 39
17. Chroma killer adjustment 39
18. Negative video color phase adjustment. 40
19. Low light warning indicator level adjustment 40

3. Adjustment after replacing deflection circuit board

1. Power voltage adjustment 40
2. Beam voltage adjustment 40
3. Horizontal size/linearity/centering adjustment . . . 41
4. Vertical size/centering adjustment 41
5. Bias light adjustment 42
6. Pulse canceller adjustment. 42
7. Dark shading adjustment. 43
8. Video level adjustment 43
9. Fild focus adjustment. 43
10. Chroma carrier level adjustment 44
11. Color separation adjustment 44
12. Black balance adjustment 44
13. White balance adjustment 45
14. Dynamic focus adjustment 45
15. Red/modulation shading adjustment. 46
16. Blue/modulation shading adjustment. 46
17. White balance readjustment. 47
18. De-γ (Degamma) adjustment. 47
19. Chroma gain, burst level adjustment 47
20. Red phase adjustment 47
21. Auto white present adjustment 47
22. Low light warning indicator level adjustment 48

4. Adjustment after replacing viewfinder circuit board

1. Pulse canceller adjustment. 48
2. Smear adjustment 48

5. Faulty shading adjustment

1. Dark shading adjustment. 49
2. Field focus adjustment 49
3. Black balance adjustment 49
4. White balance adjustment 50
5. Dynamic focus adjustment 50
6. Red/modulation shading adjustment. 51
7. Blue/modulation shading adjustment. 51
8. White balance readjustment. 52
9. De-γ (Degamma) adjustment. 52

6. Adjustment after replacing viewfinder circuit board

1. Horizontal hold adjustment. 53
2. Vertical hold adjustment. 53
3. Centering adjustment 53
4. Horizontal size adjustment 53
5. Vertical size adjustment 53
6. Brightness adjustment 53
7. Contrast adjustment. 53
8. Focus adjustment 53

7. Auto focus adjustment

1. Focus adjustment 53

ADJUSTMENT LIST

1. Adjustment after replacing camera tube/coil ass'y 54
2. Adjustment after replacing video circuit board . . . 64
3. Adjustment after replacing deflection circuit board 70
4. Adjustment after replacing preamplifier circuit board 79
5. Faulty shading adjustment 80

ADJUSTING PARTS ABBREVIATION LIST

Circuit No.	Abbreviation	Description	Circuit board
RV1	YPC	Y pulse cancel	Video
RV2	AGC	AGC gain set	Video
RV3	CCL	Chroma carrier level	Video
RV4	BST	Burst level	Video
RV5	GREF	Degamma reference	Video
RV6	YSET	Y setup	Video
RV7	CPS	Carrier phase	Video
RV8	CBAL	Carrier balance	Video
RV10	RG3	Red degamma 3	Video
RV11	RG2	Red degamma 2	Video
RV12	RG1	Red degamma 1	Video
RV13	RGN	Red gain	Video
RV14	BG3	Blue degamma 3	Video
RV15	BG2	Blue degamma 2	Video
RV16	BG1	Blue degamma 1	Video
RV17	BGN	Blue gain	Video
RV20	NP	Negative video, color phase	Video
RV21	PP	Positive video, color phase	Video
RV22	BSET	Blue setup	Video
RV23	RSET	Red setup	Video
RV24	R-Y GN	R-Y gain	Video
RV25	CKL	Chroma killer level	Video
RV26	CGN	Chroma gain	Video
RV27	DBIAS	Delay IC bias	Video
RV28	VEG	Vertical edge gain	Video
RV29	VEB	Vertical edge balance	Video
RV30	CBC	Chroma black clip	Video
CV1	SCB	B-Y sub-carrier phase	Video
RV201	RWS	Red white set	Auto white
RV202	BWS	Blue white set	Auto white
CV251	FSC	Sub-carrier frequency	SSG
RV301	FOC	Focus	Deflection
RV302	BEAM	Beam	Deflection
RV303	HLN	Horizontal	Deflection
RV304	HCT	Horizontal centering	Deflection
RV305	HGT	Height linearity	Deflection
RV306	VCT	Vertical centering	Deflection
RV323	LIS	Level indicator set	Deflection
RV324	AVL	Auto iris video level	Deflection
RV325	BL	Bias light	Deflection
RV326	ABO	Automatic beam optimizer	Deflection
RV451	9V	9V	Deflection
RV452	5V	5V	Deflection
RV453	M5V	Microprocessor 5V	Deflection
RV454	D5V	Direct 5V	Deflection
LV301	WID	Width	Deflection
RVM1-1	DHS	Dynamic focus horizontal sawtooth	Deflection
RVM1-2	DHP	Dynamic focus horizontal parabola	Deflection
RVM1-3	DVS	Dynamic focus vertical sawtooth	Deflection
RVM1-4	DVP	Dynamic focus vertical parabola	Deflection
RVM2-1	DKHS	Dark horizontal sawtooth	Deflection
RVM2-2	DKHP	Dark horizontal parabola	Deflection
RVM2-3	DKVS	Dark vertical sawtooth	Deflection
RVM2-4	DKVP	Dark vertical parabola	Deflection
RVM3-1	RHS	Red shading horizontal sawtooth	Deflection
RVM3-2	RHP	Red shading horizontal parabola	Deflection
RVM3-3	RVS	Red shading vertical sawtooth	Deflection
RVM3-4	RVP	Red shading vertical parabola	Deflection
RVM4-1	BHS	Blue shading horizontal sawtooth	Deflection
RVM4-2	BHP	Blue shading horizontal parabola	Deflection
RVM4-3	BVS	Blue shading vertical sawtooth	Deflection
RVM4-4	BVP	Blue shading vertical parabola	Deflection
CV501	SMP	Smear	Preamp
RV801	COSC	Character frequency	μCOM 1
CV801	SOSC	Stop watch frequency	μCOM 1
CV802	CLOSC	Clock frequency	μ COM1
RV1101	CONTR	Contrast	Viewfinder 1
RV1102	BRIGHT	Brightness	Viewfinder 1
RV1103	VFOC	VF focus	Viewfinder 1
LV1101	VWID	VF width	Viewfinder 1
RV1151	HHOLD	Horizontal hold	Viewfinder 2
RV1152	VHOLD	Vertical hold	Viewfinder 2
RV1153	VHCT	VF height	Viewfinder 2

BEFORE STARTING ADJUSTMENT

Check the following before starting adjustment.

1. Connection

Connection between the camera, power supply and TV set. etc.

2. Measuring instruments and tools, etc., used for adjustment.

- Measuring instruments
  Oscilloscope, frequency counter, DC voltmeter
- Tools, etc.
  (+) screwdriver (medium), (−) screwdriver (small), adjusting screwdriver, soldering iron, color viewer (3100°), test chart A, gray scale chart, color bar chart, resistors 4.7 kΩ ~ 10 kΩ (1/8 ~ 1/2W), tripod, monitor TV set.

3. Preparation

- Set distance between the camera lens and color viewer to 1 m.

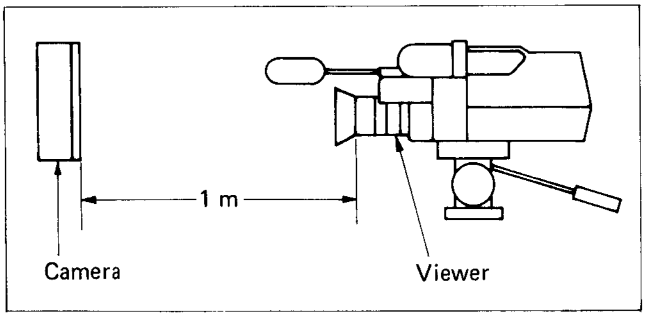


Fig. 1

- Camera operation switch positions

Power save switch:	Set to PWR SAVE during preparation (NORM during adjustment)
Iris control:	Click position
Indoor/outdoor switch	Indoor position
Neg/norm switch	Norm position
White balance control:	Click position

- Use CN002 (video board) or CN301 (deflection board) when applying external sync.
  V period: CN002 ..... Pin 3 or CN301 ..... Pin 14
  H period: CN002 ..... Pin 2 or CN301 ..... Pin 15
- GND-video board: TP019 or deflection board: TP301
- Video signal output: Video board TP3
- Set the power save switch of the camera to NORM and then set the switch of the color viewer to ON when starting adjustment. Be sure to observe this procedure, if it is done in reverse, the SATICON tube may be burnt.
- Shoot the chart for the full video period when otherwise not specified.
- Set the time axis of the oscilloscope to the H period (horizontal period) in general. Switch over to the V period when specified.
- "White chart" means "shoot without inserting a chart into the color viewer".
- Set the probe to 10:1 in general.

ADJUSTMENT

1. ADJUSTMENT AFTER REPLACING CAMERA TUBE/COIL ASS'Y

1. Beam voltage adjustment

RV302, 326: Deflection board
(RV301, 303, 304, 305, 306, LV301: Deflection board)
TP3, TP1: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the test chart A.
3) Turn RV302 clockwise to make the picture appear when the picture does not appear on the TV screen.
4) Bring the picture into focus while observing the TV screen.
   Adjust RV301 to bring the picture into focus.
   * Item 5 is not required when the circle of the chart appears round while observing the TV screen.
5) When the circle of the chart is not round on the TV screen, adjust the control VRs shown below so that it is made round and the size roughly matches.
   RV303: Horizontal linearity
   RV304: Horizontal centering
   LV301: Horizontal size (WIDE)
   RV305: Vertical size (HEIGHT)
   RV306: Vertical centering
6) Connect an oscilloscope to TP1 on the video board.
7) Turn RV326 fully counterclockwise.
8) Shoot the chart as shown in Fig. 2.
   Set the zoom to the same position as that when the test chart A is shot in item 2.

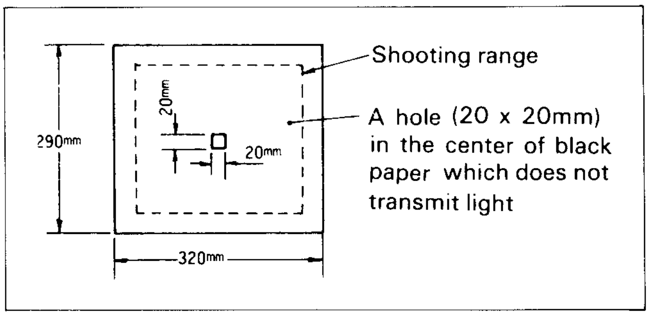

Shooting range
A hole (20 x 20mm) in the center of black paper which does not transmit light
290mm
320mm
20mm
20mm

Fig. 2

9) Adjust RV302 so that the click level of the beam is 1.5 Vp-p ± 0.05V.
10) Adjust RV326 so that the click level of the beam is 2.4 Vp-p ± 0.1V.

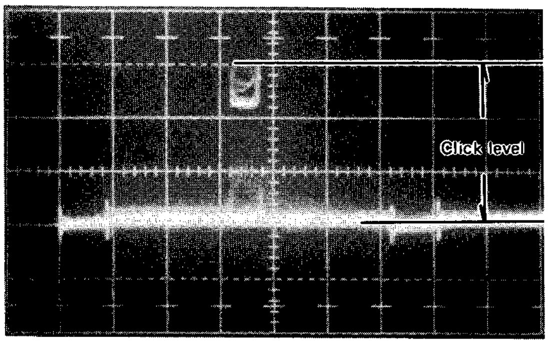
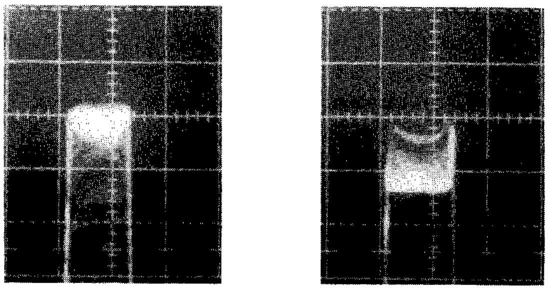


Fig. 3

When the camera is aimed at the chart and the waveform becomes as in Fig. 4 (a), adjustment cannot be performed correctly, so turn the iris control to increase the incident light and obtain the waveform as in (b).


(a) (b) Fig. 4

2. **Back-focus adjustment**
   1) Set the distance between the color viewer and camera lens surface to 3 m.

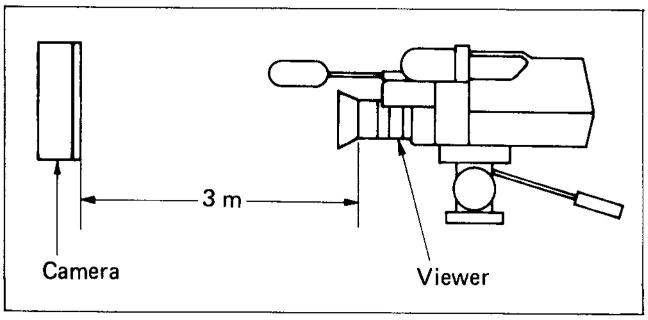


Fig. 5

   2) Shoot the test chart A.
   3) Adjust zoom to set to TELEPHOTO and focus using the lens focus ring.
   4) Next set the lens to WIDE.
   5) Loosen the back-focus fixing screw, turn the focus control screw to focus.

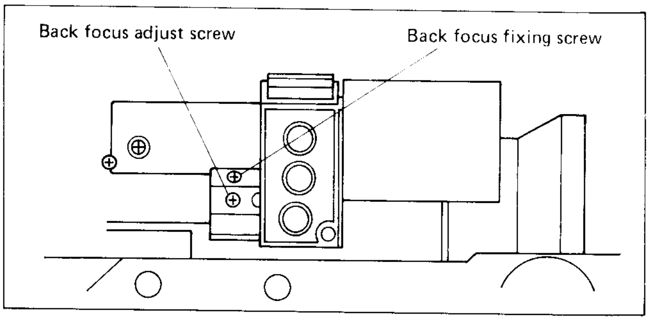


Fig. 6

   6) Set the zoom to TELEPHOTO again and focus using the lens focus ring.
   7) Repeatedly adjust TELEPHOTO and WIDE so that both are focused. Set the index to match 3 m when TELEPHONO and WIDE are both focused.
   8) Check that it is in focus when the index is set to "∞" and a remote object (10 m or more away) is shot.
   9) Tighten the back-focus fixing screw.

3. **Horizontal size/linearity/centering adjustment**

   RV303, 304, LV301: Deflection board
   TP3: Video board
   1) Connect an oscilloscope to TP3 on the video board.
   2) Shoot a white chart and set the zoom to TELEPHOTO.
   3) Turn LV301 to shorten the waveform width and make optical black appear a little to the left and right.

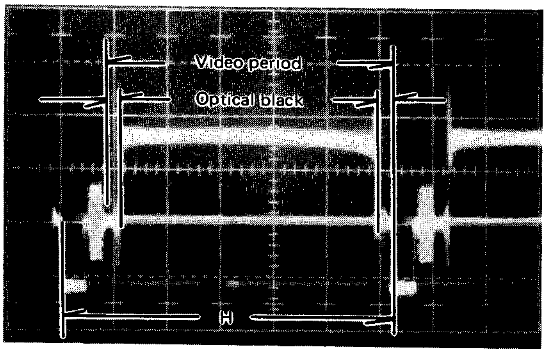
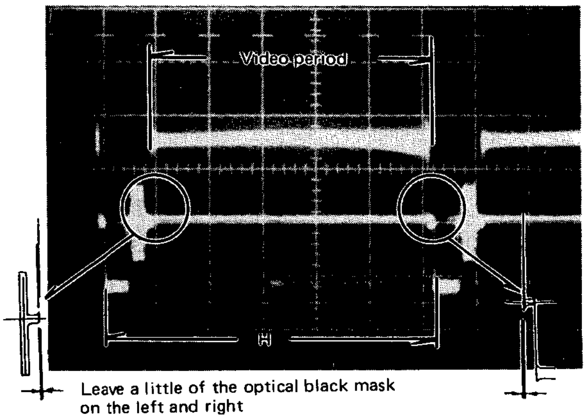


Fig. 7

   4) Adjust RV304 so that the left and right optical black is symmetrical.
   5) Shoot the test chart A.
   6) Adjust RV303 so that the circle on the TV screen is symmetrical to the left and right.
   7) Shoot a white chart and set the zoom to TELEPHOTO.
   8) Adjust LV301 so that the optical black mask remains a little on the left and right. Fine adjust RV304 at this time so that the optical black mask is symmetrical on the left and right.

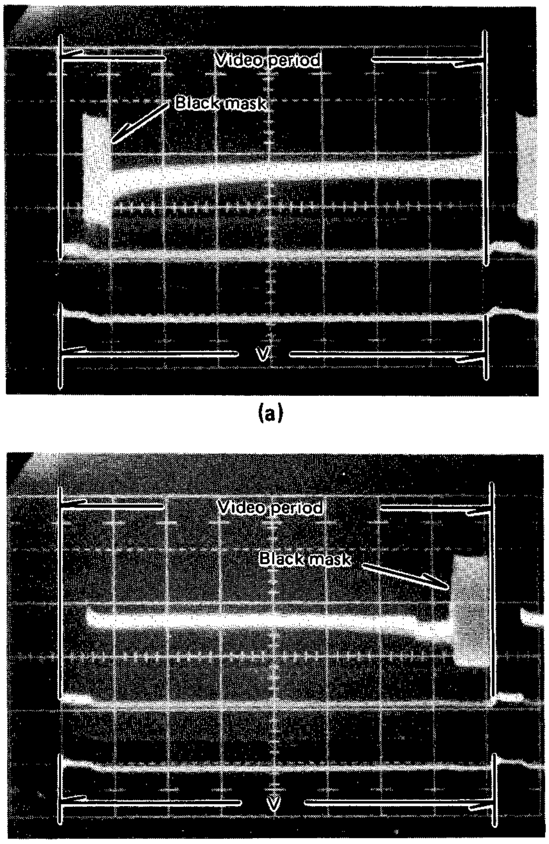

Video period
H

Leave a little of the optical black mask on the left and right

Fig. 8

4. **Vertical size/centering adjustment**
   RV305, 306: Deflection board
   TP3, TP1: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Set the oscilloscope to the V period.
4) Turn RV305 to shorten the wave width and make black mask appear a little on the left and right.
   * The black mask is seen as a green horizontal bar on the TV screen.


Video period
Black mask
V
Video period
Black mask
V

(a)

(b)

Fig. 9

5) Adjust RV306 so that the black mask is symmetrical on the left and right.
6) Connect the oscilloscope set to the V period to TP1 on the video board.
7) Adjust RV305 so that beats in the waveform are minimum.

*When RV305 is turned, the width increases as beats in the waveform decrease. Adjust finely RV306 so that the black mask is symmetrical on the left and right.

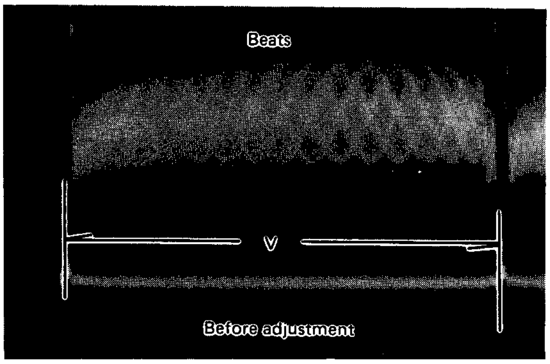

Beats
V
Before adjustment

Fig. 10

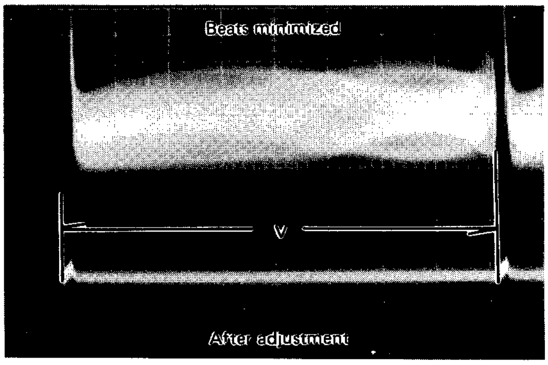

Beats minimized
V
After adjustment

Fig. 11

5. **Bias light adjustment**
   RV325: Deflection board
   TP1: Video board

1) Fit the lens cap.
2) Set the probe to 1:1 and connect it to TP1 on the video board via a resistor (4.7 kΩ ~ 10 kΩ).
   * When the probe is held near the tip, noise is picked up.

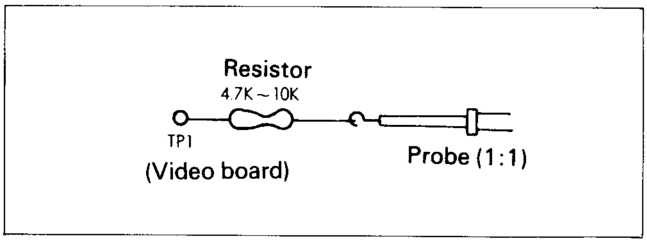

Resistor
4.7K~10K
TP1
(Video board)
Probe (1:1)

Fig. 12

3) Adjust RV325 so that the level at the waveform center is 20 mVp-p ± 2 mV.

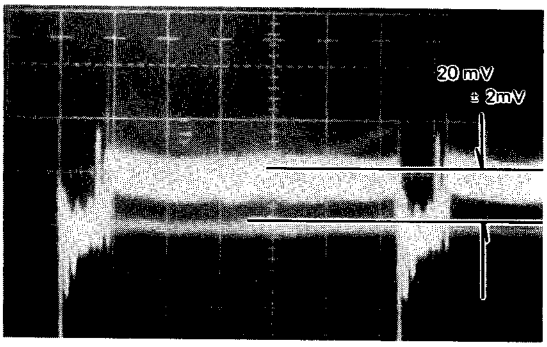


Fig. 13

6. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP2 on the video board.
3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as posible.

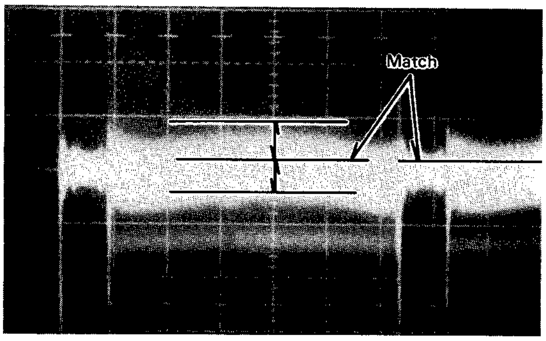
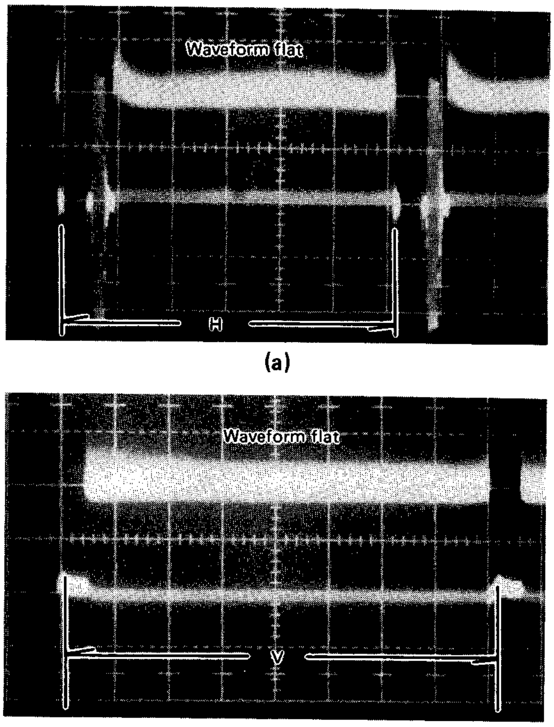


Fig. 14

7. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 on the video board so that the setup level is 0.2 Vp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 15

8. Y setup adjustment

RV6: Video board
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Adjust RV6 so that the setup level is 0 mVp-p ± 20 mV.

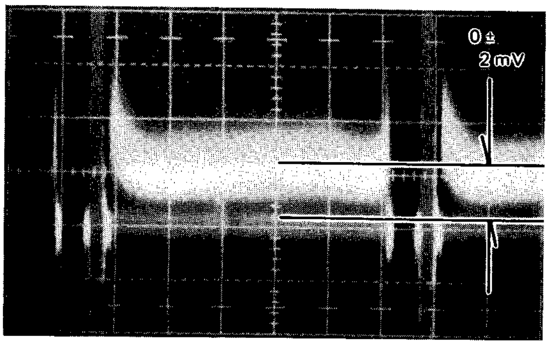


Fig. 16

9. Edge balance adjustment

RV27, 29: Video board
TP17, TP18: Video board

1) Connect an oscilloscope to TP17 on the video board.
2) Shoot a gray scale chart.
3) Adjust RV27 so that the staircase waveform is maximized.

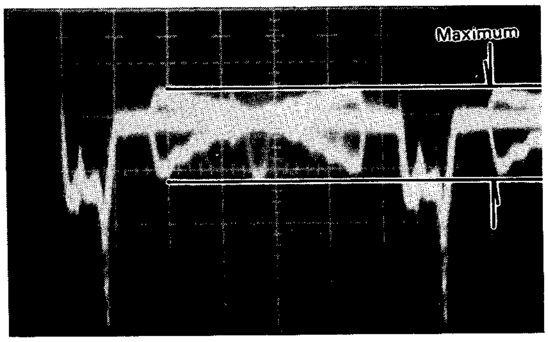


Fig. 17

4) Connect the oscilloscope to TP18 on the video board.
5) Adjust RV29 so that the waveform is minimized.

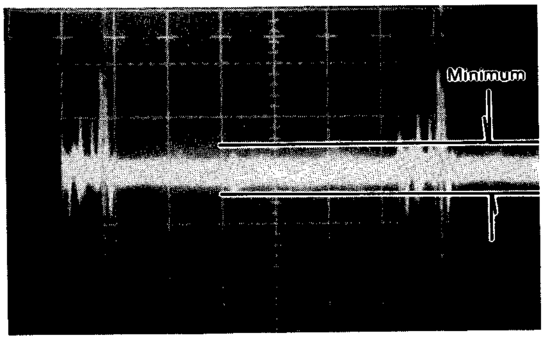


Fig. 18

10. Video level adjustment

RV2: Video board
RV324: Deflection board
TP1, TP3: Video board

1) Connect an oscilloscope to TP1 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV324 so that the video signal component of the waveform is 600 mVp-p ± 20 mV.

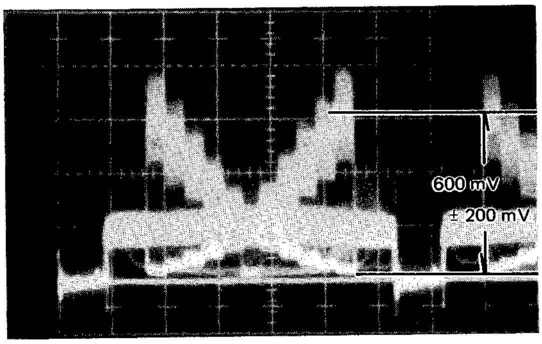


Fig. 19

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05 V.

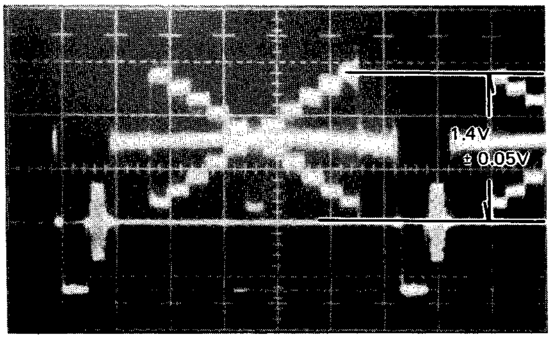


Fig. 20

11. Field focus adjustment

RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP301-305: Deflection board
TP5: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Connect an oscilloscope to TP301 on the deflection board.
3) Preadjust RVM1-1 - RVM1-4 so that the waveform is minimized.
4) Connect an oscilloscope to TP5 on the video board.
5) Shoot a white chart and set the zoom to TELE-PHOTO.
6) Adjust RV301 so that the carrier level is max. and the flat range without peaks or troughs is as wide as possible.
   * This is to faciliate shading correction later.

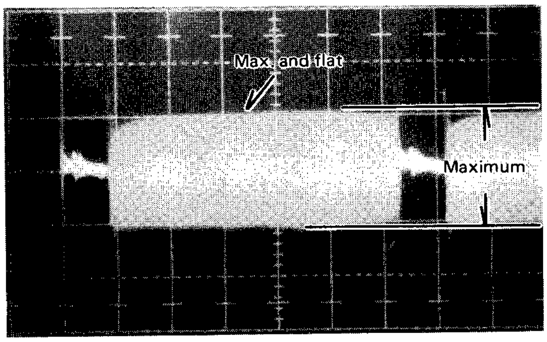


Fig. 21

12. Chroma carrier level adjustment

RV3: Video board
TP5: Video board

1) Connect an oscilloscope to TP5 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV3 so that the waveform level is 250 Vp-p ± 20 mV.
   * Use the oscilloscope with the probe set to 1:1. Otherwise, the black portion (1st ~ 4th steps from the bottom) of the waveform is distorted.

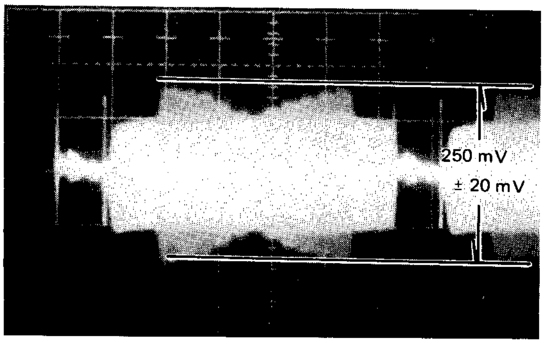


Fig. 22

13. Color separation adjustment

TP7: Video board
RV7, 8: Video board

1) Connect an oscilloscope to TP7 on the video board.
2) Shoot the color bar chart.
3) Alternately adjust RV7 and RV8 to minimize the yellow level of the waveform.

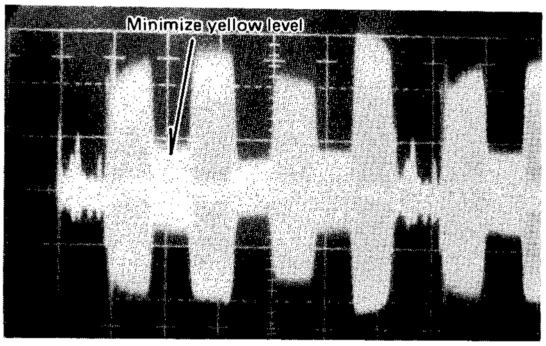


Fig. 23

14. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear.

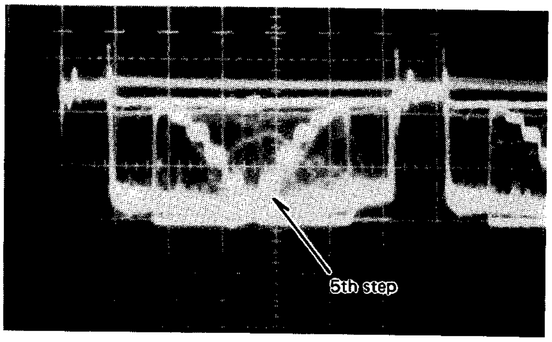


Fig. 24

4) Connect an oscilloscope to TP3 on the video board.
5) Alternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform.

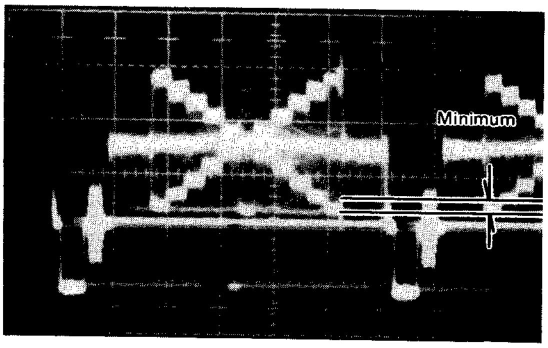


Fig. 25

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.3 V ± 0.02 V.

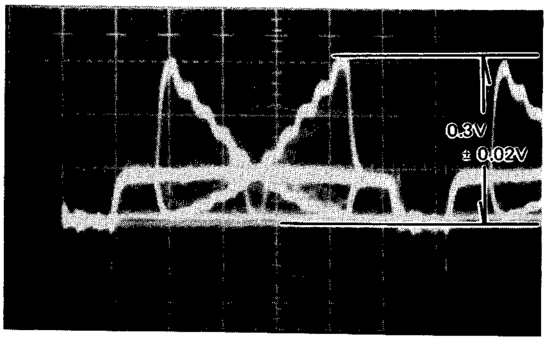


Fig. 26

15. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.

2) Shoot the gray scale chart.
3) Alternately adjust RV3 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

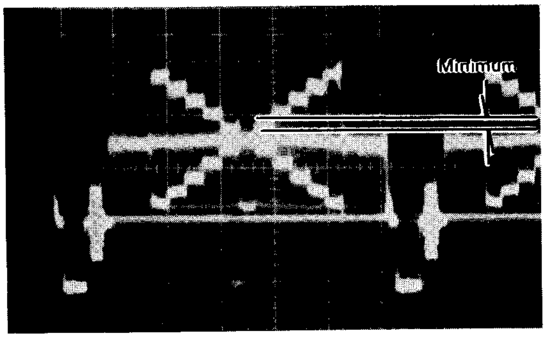
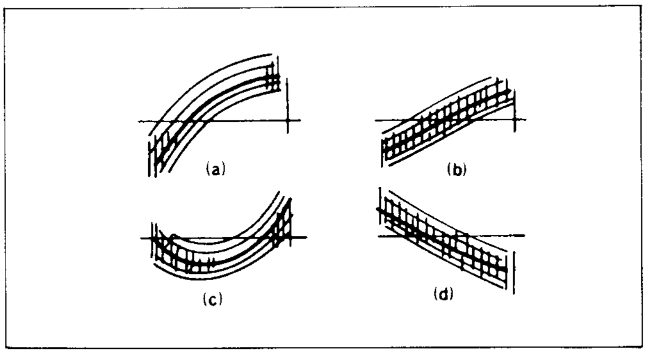


Fig. 27

16. Dynamic focus adjustment

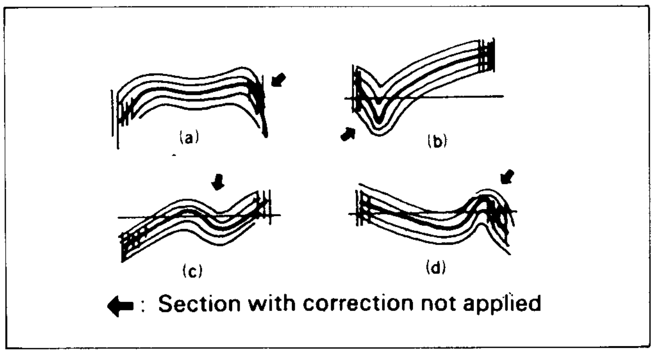
RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP12, TP14: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Connect one channel of an oscilloscope to TP12 (R-YL) on the video board and the other channel to TP14 (R-YL).
4) Set input range of an oscilloscope to 10 mV/div (10:1 probe used) for both channels and set to the DUAL mode.
5) Adjust RVM1-1, RVM1-2 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 28

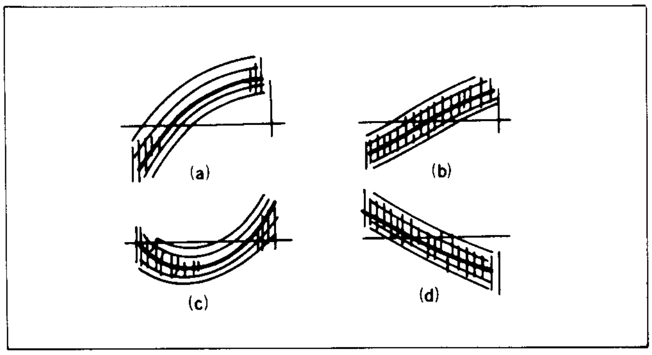


⬅ : Section with correction not applied

Waveform making it difficult to correct shading

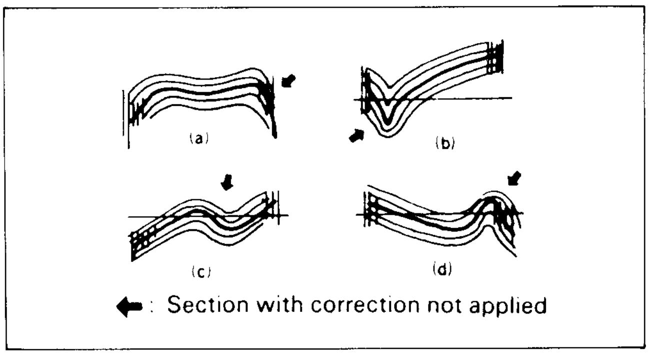
Fig. 29

6) Set an oscilloscope to the V period.
7) Adjust RVM1-3, RV1-4 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it difficult to correct shading

Fig. 30



⬅ : Section with correction not applied

Waveform making it difficult to correct shading

Fig. 31

8) Remove short-circuit.
9) When the waveform making it easy to apply shading correction cannot be obtained by the above adjustment adjust the field focus in item 11, and then adjust as shown in 7) ~ 9), item 16 again.

17. Red/modulation shading adjustment

RVM3-1, 3-2, 3-3, 3-4: Deflection board
TP12: Video board

1) Shoot the white chart and set the zoom to TELEPHOTO.
2) Connect an oscilloscope to TP12 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

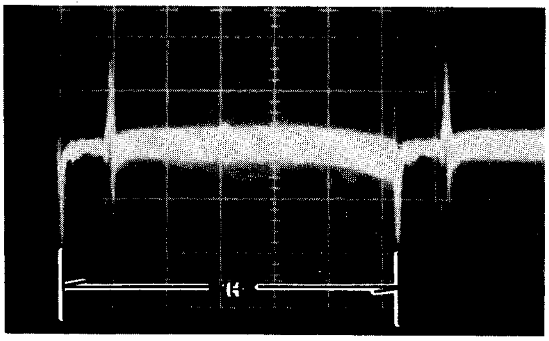


Fig. 32

5) Set an oscilloscope to the V period.
6) Adjust RVM3-3 and RVM3-4 so that the waveform is as flat as possible.

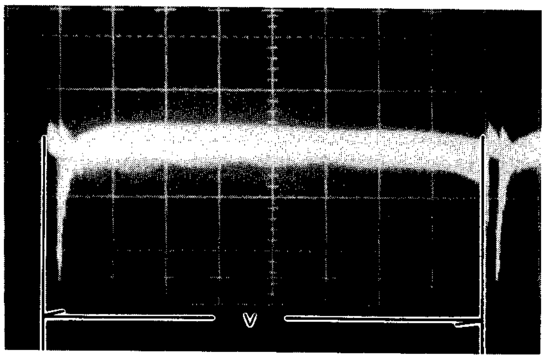


Fig. 33

18. Blue/modulation shading adjustment

RVM4-1, 4-2, 4-3, 4-4: Deflection board
TP14: Video board

1) Shoot the white chart and set the zoom to TELEPHOTO.
2) Connect an oscilloscope to TP14 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

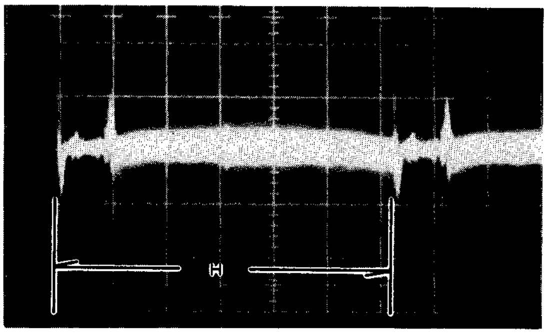


Fig. 34

5) Set an oscilloscope to the V period.
6) Adjust RVM4-3 and RVM4-4 so that the waveform is as flat as possible.

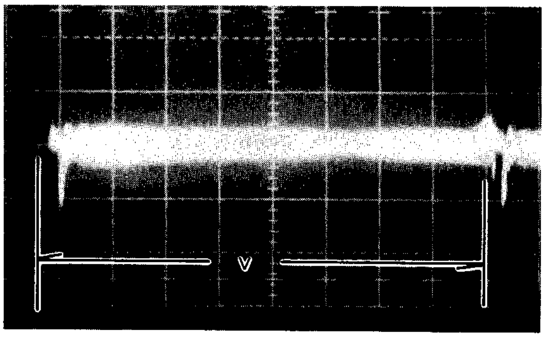


Fig. 35

19. White balance readjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV3 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

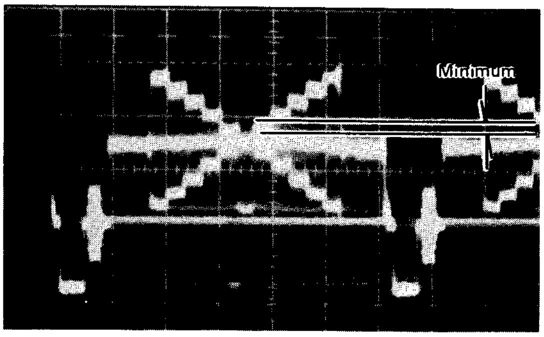


Fig. 36

20. De-γ (Degamma) Adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st – 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th – 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

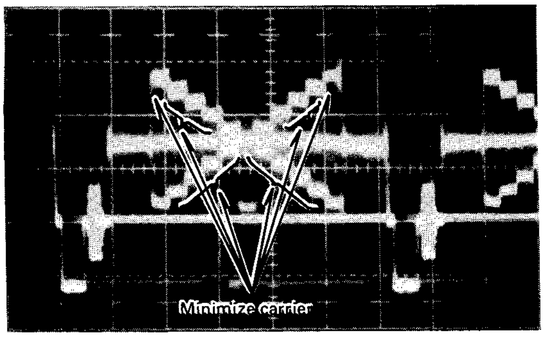


Fig. 37

21. Chroma gain, burst level adjustment

TP3: Video board
RV4, 24, 26: Video board
Iris control: Side of camera

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the color bar chart.
3) Set the white level of the video signal color bar to 1.2 Vp-p using the iris control.
4) Adjust RV24 so that the ratio of the yellow and red carrier levels of the video signal color bar becomes 2:3.
5) Adjust RV26 to set the red carrier level of the waveform to 0.94 Vp-p ± 0.04 V.

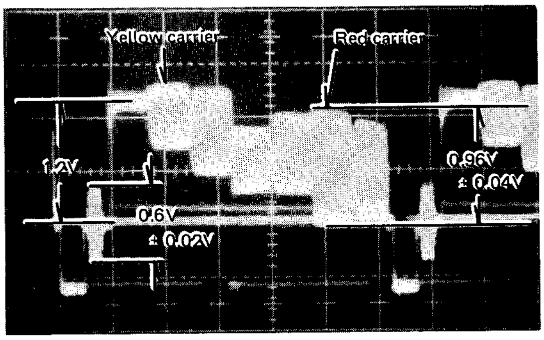


Fig. 38

6) Adjust RV4 to set the burst level to 0.6 Vp-p ± 0.02 V.
7) Return the iris control to its click position.

22. Red phase adjustment

RV21: Video board

1) Shoot the color bar chart.
2) Adjust RV21 so that the tint of the red of both the TV screen and the color bar chart match as much as possible.

23. Smear adjustment

CV501: Preamplifier board

This adjustment is performed only when color smear is present. Readjust Chroma carrier level, Black balance, White balance and De-γ (Degamma) again when smear has been adjusted.

1) Shoot the gray scale chart.
2) Adjust CV501 so that color smear does not occur on the right of the white section of the gray scale on the TV screen.

2. ADJUSTMENT AFTER REPLACING VIDEO CIRCUIT BOARD

1. Sub-carrier frequency adjustment

CV251: Video board
TP16: Video board

1) Connect a frequency counter to TP16 on the video board.
2) Adjust CV251 so that the frequency counter indicates 4.433619 MHz ± 100 Hz.

2. PLL adjustment

LV251: SSG board on the video board
TP251: SSG board on the video board

1) Connect a DC voltmeter to TP251 on the SSG board.
2) Adjust LV251 so that the DC voltmeter indicates 3.0 V ± 0.1 V.

3. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TR2 on the video board.
3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as possible.

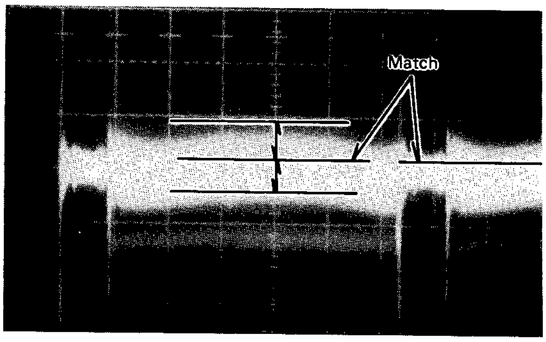
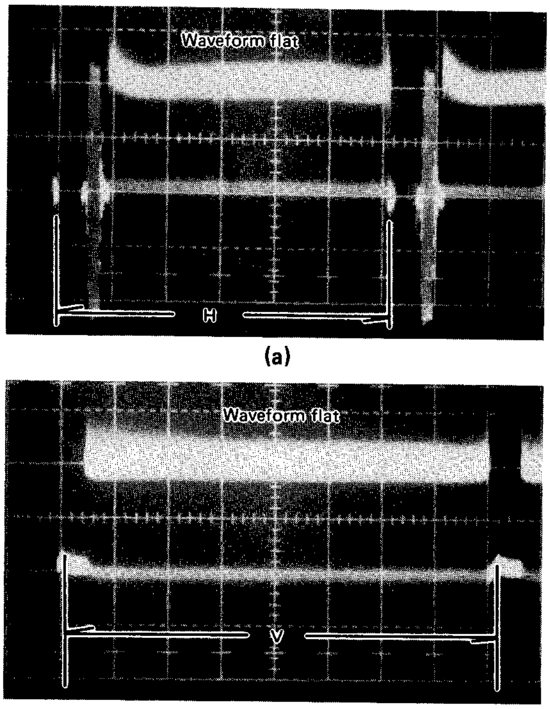


Fig. 41

4. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 so that the setup level is 0.2 Vp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 42

5. Y setup adjustment

RV6: Video board
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Adjust RV6 so that the setup level is 0 mVp-p ± 20 mV.

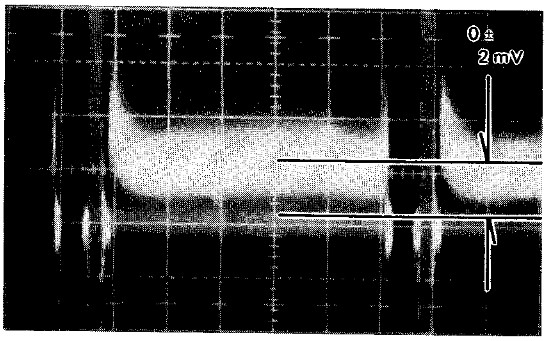


Fig. 43

6. Edge balance adjustment

RV27, 29: Video board
TP17, TP18: Video board

1) Connect an oscilloscope to TP17 on the video board.
2) Shoot a gray scale chart.
3) Adjust RV27 so that the staircase waveform is maximized.

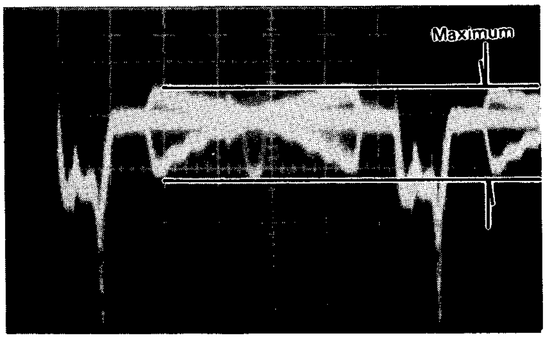


Fig. 44

4) Connect the oscilloscope to TP18 on the video board.
5) Adjust RV29 so that the waveform is minimized.

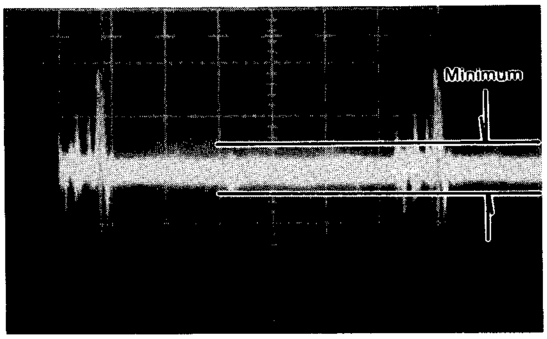


Fig. 45

7. Video level adjustment

RV2: Video board
RV324: Deflection board
TP1, TP3: Video board

1) Connect an oscilloscope to TP1 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV324 so that the video signal component of the waveform is 600 mVp-p ± 20 mV.

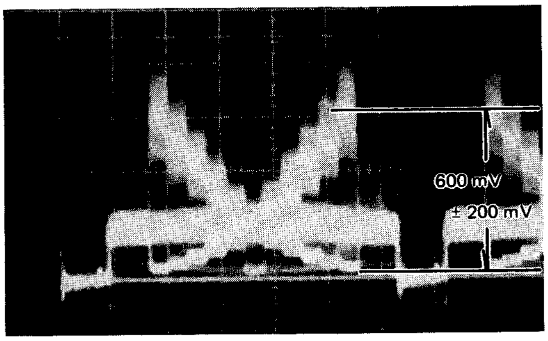


Fig. 46

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05 V.

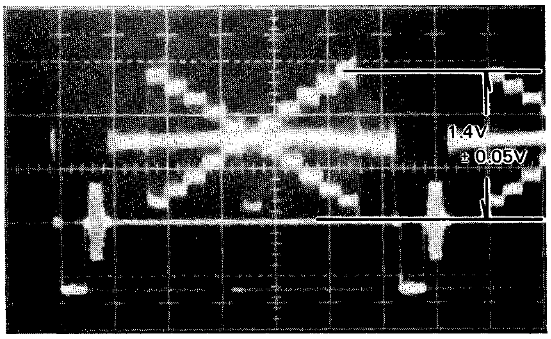


Fig. 47

8. Chroma carrier level adjustment

RV3: Video board
TP5: Video board

1) Connect an oscilloscope to TP5 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV3 so that the waveform level is 250 mVp-p ± 20 mV.
   - * Use the oscilloscope with the probe set to 1:1. Otherwise, the black portion (1st ~ 4th steps from the bottom) of the waveform is distorted.

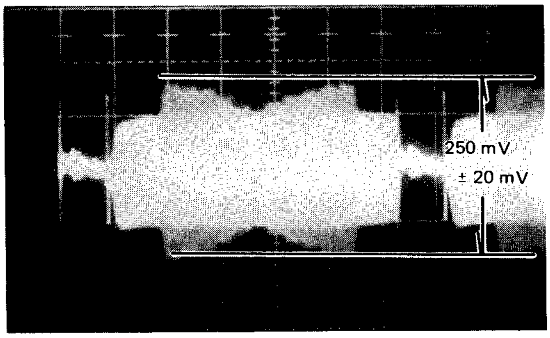


Fig. 48

9. Color separation adjustment

TP7: Video board
RV7, 8: Video board

1) Connect an oscilloscope to TP7 on the video board.
2) Shoot the color bar chart.
3) Alternately adjust RV7 and RV8 to minimize the yellow level of the waveform.

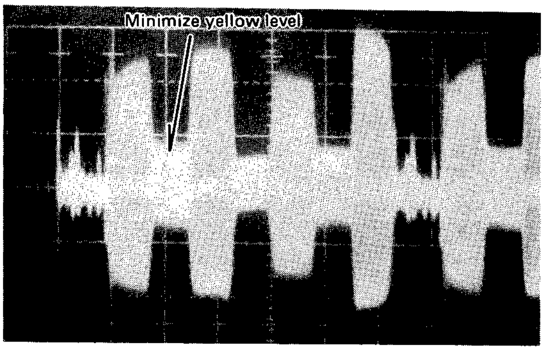


Fig. 49

10. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear.

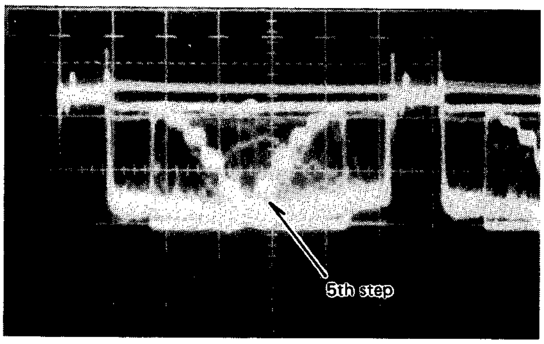


Fig. 50

4) Connect an oscilloscope to TP3 on the video board.
5) Alternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform.

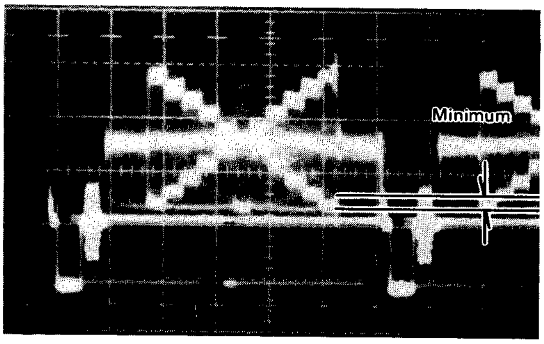


Fig. 51

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.3 V ± 0.02 V.

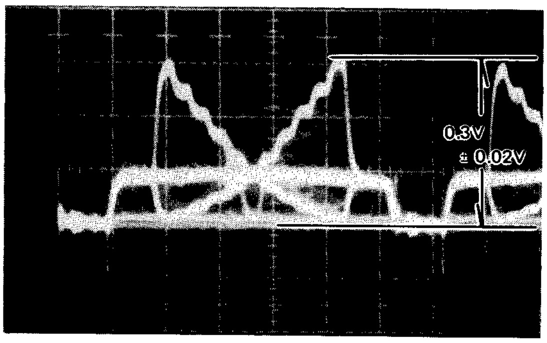


Fig. 52

11. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

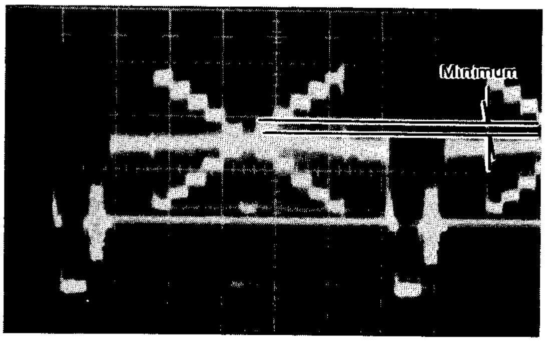


Fig. 53

12. De-γ (Degamma) adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st – 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th – 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

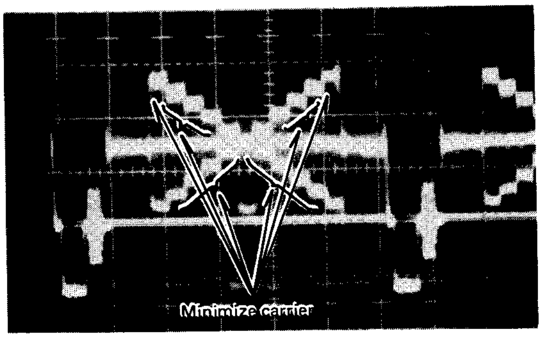


Fig. 54

13. Vertical false signal elimination adjustment

RV28: Video board

1) Shoot the gray scale chart.
2) Adjust RV28 so that the vertical false signal on the bottom of the gray scale on the TV screen is minimized.

14. Chroma gain, burst level adjustment

TP3: Video board
RV 4, 24, 26: Video board
Iris control: Side of camera

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the color bar chart.
3) Set the white level of the video signal color bar to 1.2 Vp-p using the iris control.
4) Adjust RV24 so that the ratio of the yellow and red carrier levels of the video signal color bar becomes 2:3.
5) Adjust RV26 to set the red carrier level of the waveform to 0.94 Vp-p ± 0.04 V.
6) Adjust RV4 to set the burst level to 0.6 Vp-p ± 0.02 V.
7) Return the iris control to its click position.

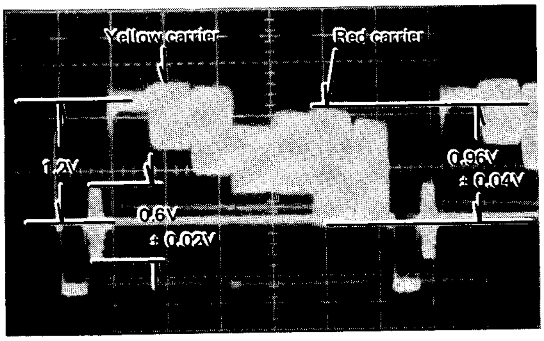


Fig. 55

15. Red phase adjustment

RV21: Video board

1) Shoot the color bar chart.
2) Adjust RV21 so that the tint of the red of both the TV screen and the color bar chart match as much as possible.

16. Auto whie preset adjustment

RV201, 202: Auto white board on the video board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Set the white balance switch to "SET" position.
4) Adjust RV201 and RV202 to minimize the carrier level at the center portion of the video period within 1 second.
   * When the minimized carrier level is not obtained, repeat items 3 and 4.

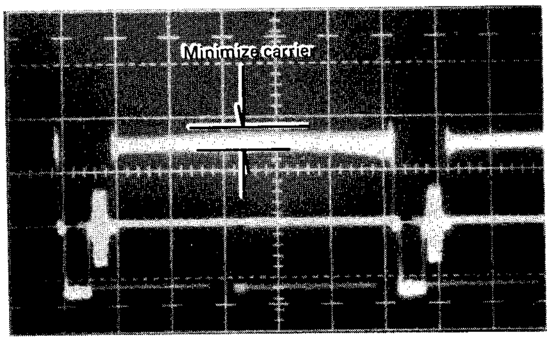


Fig. 56

17. Chrome killer adjustment

RV25: Video board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Set the indoor/outdoor switch to "OUTDOOR" position.
3) Shoot the gray scale chart.
4) Adjust the iris control to clip the 1st step from the top of the staircase waveform.
5) Adjust RV25 so that the carrier level at the clipped 1st step is 20 mVp-p or less.
6) Return the iris control to iris click position and the indoor/outdoor to "INDOOR" position.

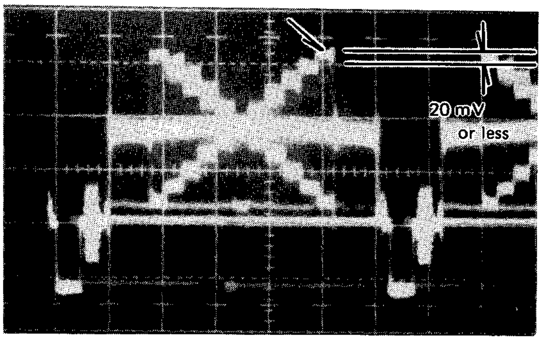


Fig. 57

18. Negative video color phase adjustment

RV20: Video board

1) Set the negative/positive switch on the back of the camera to "NEG" position.
2) Shoot the color bar chart.
3) Adjust RV20 so that the tint at the right end section of the color bar of the TV screen match to the tint at yellow of the color bar chart as much as possible.

19. Low light warning indicator level adjustment

RV323: Deflection board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Display the operation check pattern on the viewfinder by pressing the check/normal button.
4) Adjust RV324 so that the video signal level is 0.8 Vp-p ± 0.05 V.
5) Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW".
6) After above adjustment is completed, readjust the video level, item 7.

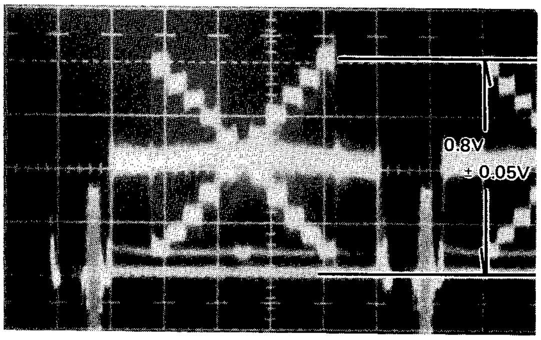


Fig. 58

3. ADJUSTMENT AFTER REPLACING DEFLECTION CIRCUIT BOARD

1. Power voltage adjustment

RV451 ~ 454: Deflection board
TP306 ~ 309: Deflection board

1) Connect a DC voltmeter to TP306 on the deflection board.
2) Adjust RV451 so that the voltmeter indicates 9.0 V ± 0.01 V.
3) Connect a DC voltmeter to TP308 on the deflection board.
4) Adjust RV452 so that the voltmeter indicates 5.0 V ± 0.01 V.
5) Connect a DC voltmeter to TP307 on the deflection board.
6) Adjust RV453 so that the voltmeter indicates 5.0 V ± 0.01 V.
7) Connect a DC voltmeter to TP309 on the deflection board.
8) Adjust RV454 so that the voltmeter indicates 5.1 V ± 0.01 V.

2. Beam voltage adjustment

RV302, 326: Deflection board
(RV301, 303, 304, 305, 306, LV301: Deflection board)
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the test chart A.
3) Turn RV302 clockwise to make the picture appear when the picture does not appear on the TV screen.
4) Bring the picture into focus while observing the TV screen.
   Adjust RV301 to bring the picture into focus.
   * Item 5 is not required when the circle of the chart appears round while observing the TV screen.
5) When the circle of the chart is not round on the TV screen, adjust the control VRs shown below so that it is made round and the size roughly matches.
   RV303: Horizontal linearity
   RV304: Horizontal centering
   LV301: Horizontal size (WIDE)
   RV305: Vertical size (HEIGHT)
   RV306: Vertical centering
6) Connect an oscilloscope to TP1 on the video board.
7) Turn RV326 fully counterclockwise.
8) Shoot the chart as shown in Fig. 61.
   Set the zoom to the same position as that when the test chart A is shot in item 2.

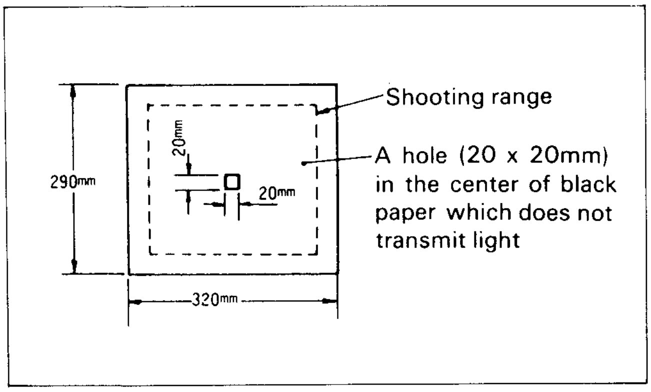

290mm
20mm
20mm
320mm
Shooting range
A hole (20 x 20mm) in the center of black paper which does not transmit light

Fig. 61

9) Adjust RV302 so that the click level of the beam is 1.5 Vp-p ± 0.05 V.

10) Adjust RV326 so that the click level of the beam is 2.4 Vp-p ± 0.1 V.

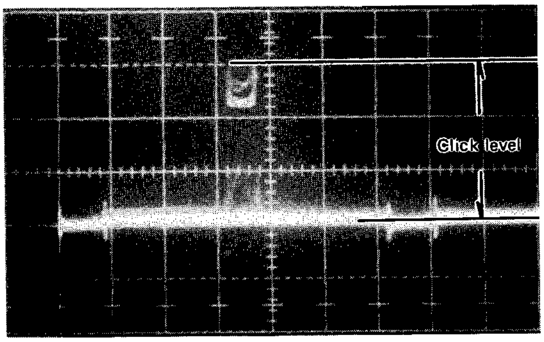
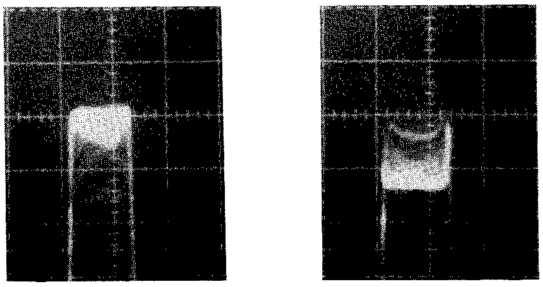


Fig. 62

When the camera is aimed at the chart and the waveform becomes as in Fig. 63 (a), adjustment cannot be performed correctly, so turn the iris control to increase the incident light and obtain the waveform as in (b).



(a) (b)

Fig. 63

3. Horizontal size/linearity/centering adjustment

RV303, 304, LV301: Deflection board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.

2) Shoot a white chart and set the zoom to TELEPHOTO.

3) Turn LV301 to shorten the waveform width and make optical black appear a little to the left and right.

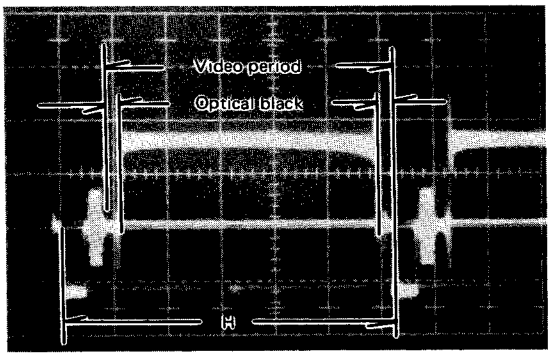


Fig. 64

4) Adjust RV304 so that the left and right optical black is symmetrical.

5) Shoot the test chart A.

6) Adjust RV303 so that the circle on the TV screen is symmetrical to the left and right.

7) Shoot a white chart and set the zoom to TELEPHOTO.

8) Adjust LV301 so that the optical black mask remains a little on the left and right. Fine adjust RV304 at this time so that the optical black mask is symmetrical on the left and right.

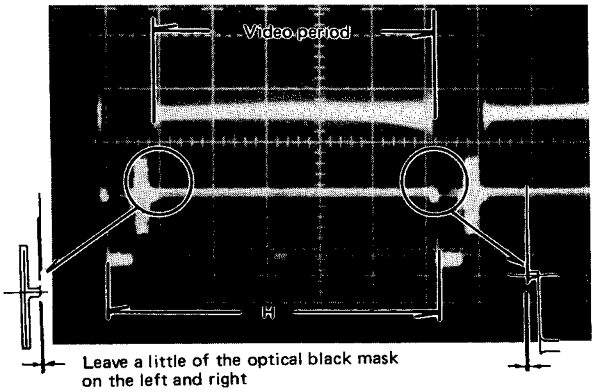


Fig. 65

4. Vertical size/centering adjustment

RV305, 306: Deflection board
TP3, TP1: Video board

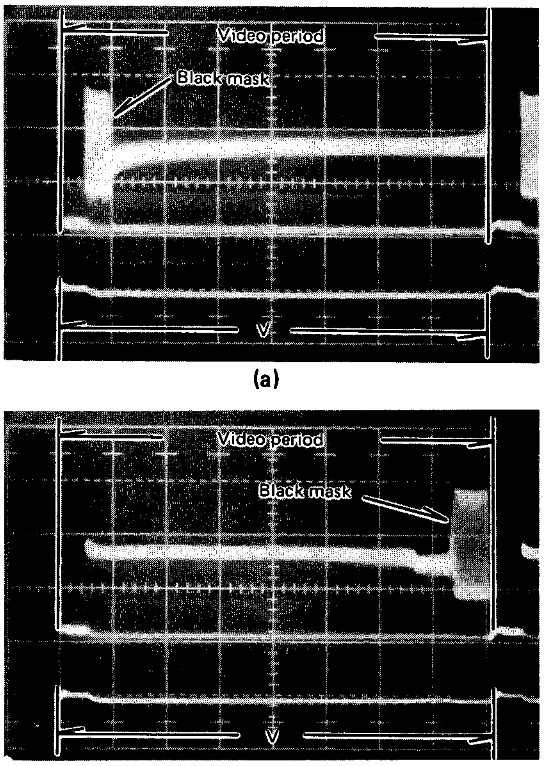
1) Connect an oscilloscope to TP3 on the video board.

2) Shoot the white chart and set the zoom to TELEPHOTO.

3) Set the oscilloscope to the V period.

4) Turn RV305 to shorten the wave width and make black mask appear a little on the left and right.

* The black mask is seen as a green horizontal bar on the TV screen.



(b)

Fig. 66

5) Adjust RV306 so that the black mask is symmetrical on the left and right.
6) Connect the oscilloscope set to the V period to TP1 on the video board.
7) Adjust RV305 so that beats in the waveform are minimum.

*When RV305 is turned, the width increases as beats in the waveform decrease. Adjust finely RV306 so that the black mask is symmetrical on the left and right.

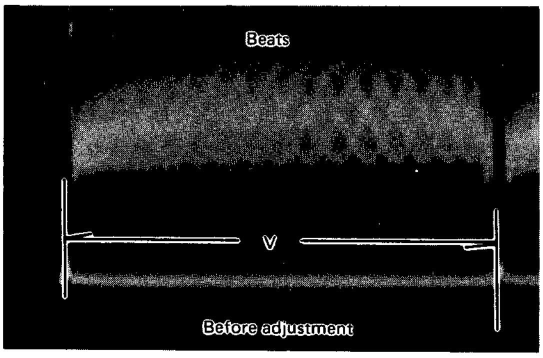


Fig. 67

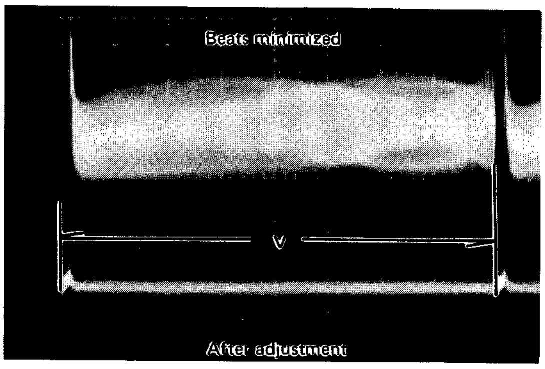


Fig. 68

5. **Bias light adjustment**
   RV325: Deflection board
   TP1: Video board
1) Fit the lens cap.
2) Set the probe to 1:1 and connect it to TP1 on the video board via a resistor (4.7 kΩ – 10 kΩ)
   * When the probe is held near the tip, noise is picked up.

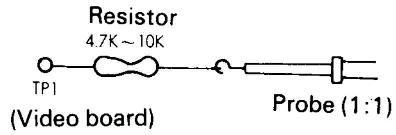


Fig. 69

3) Adjust RV325 so that the level at the waveform center is 20 mVp-p ± 2 mV.

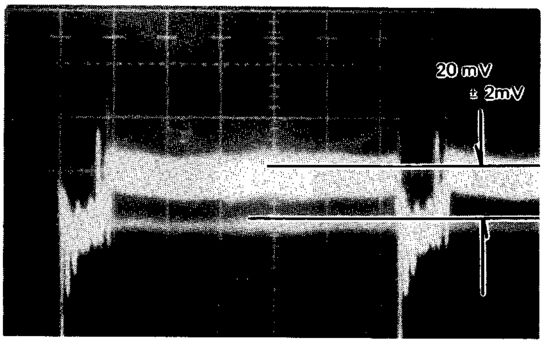


Fig. 70

6. **Pulse canceller adjustment**
   RV1: Video board
   TP2: Video board
1) Fit the lens cap.
2) Connect an oscilloscope to TP2 on the video board.

3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as possible.

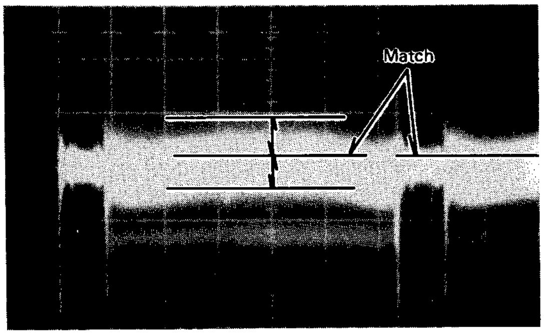
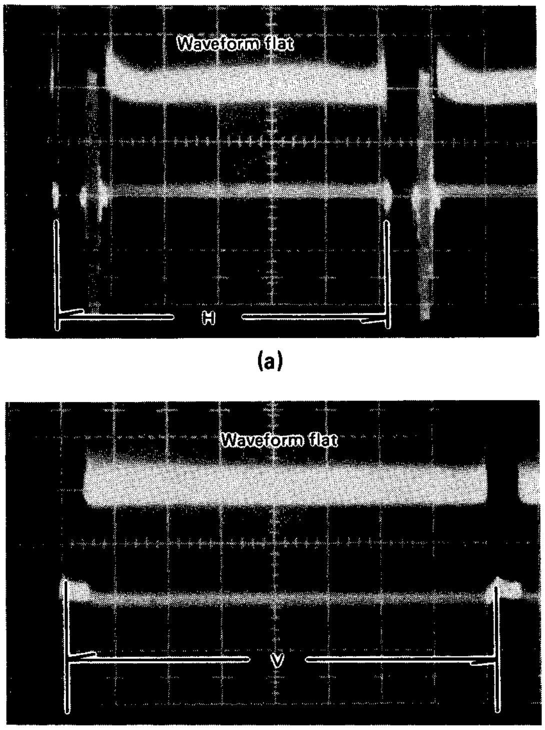


Fig. 71

7. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 on the video board so that the setup level is 0.2 Vp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 72

8. Video level adjustment

RV2: Video board
RV323: Deflection board
TP1, TP3: Video board

1) Connect an oscilloscope to TP1 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV323 so that the video signal component of the waveform is 600 mVp-p ± 20 mV.

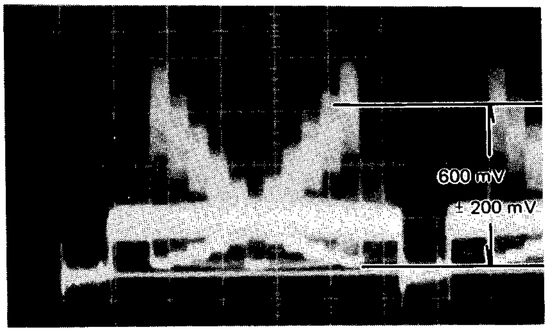


Fig. 73

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05 V.

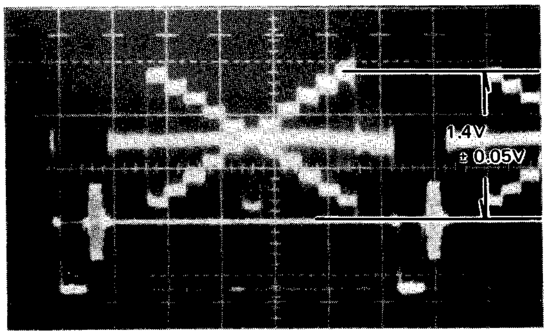


Fig. 74

9. Field focus adjustment

RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP301 ~ 305: Deflection board
TP5: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Connect an oscilloscope to TP301 on the deflection board.
3) Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
4) Connect an oscilloscope to TP5 on the video board.
5) Shoot a white chart and set the zoom to TELEPHOTO.

6) Adjust RV301 so that the carrier level is max. and the flat range without peaks or troughs is as wide as possible.

* This is to faciliate shading correction later.

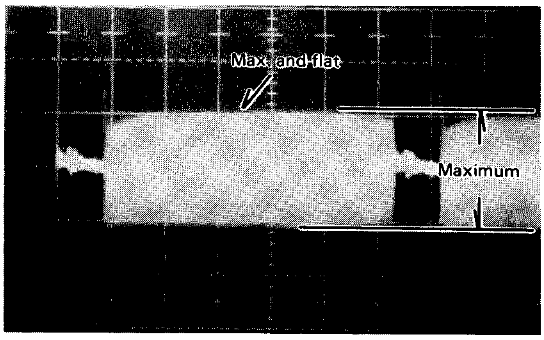


Fig. 75

10. Chroma carrier level adjustment

RV3: Video board
TP5: Video board

1) Connect an oscilloscope to TP5 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV3 so that the waveform level is 250 mVp-p ± 20 mV.

* Use the oscilloscope with the probe set to 1:1. Otherwise, the black portion (1st ~ 4th steps from the bottom) of the staircase waveform is distorted.

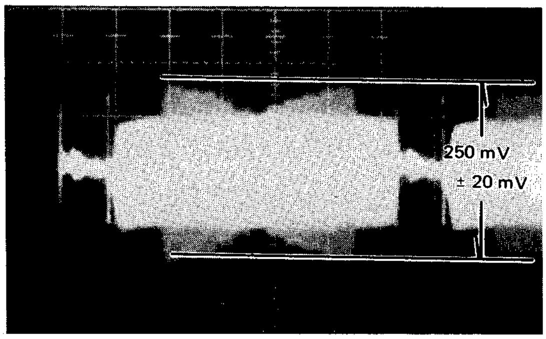


Fig. 76

11. Color separation adjustment

TP7: Video board
RV7, 8: Video board

1) Connect an oscilloscope to TP7 on the video board.
2) Shoot the color bar chart.
3) Alternately adjust RV7 and RV8 to minimize the yellow level of the waveform.

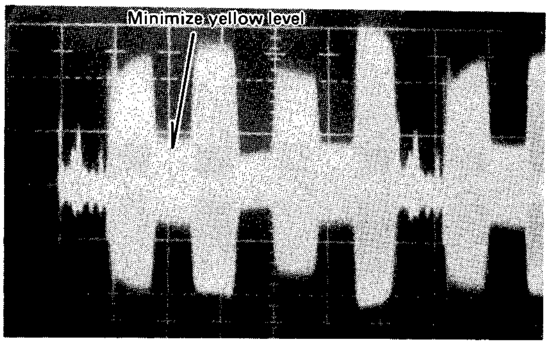


Fig. 77

12. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear.

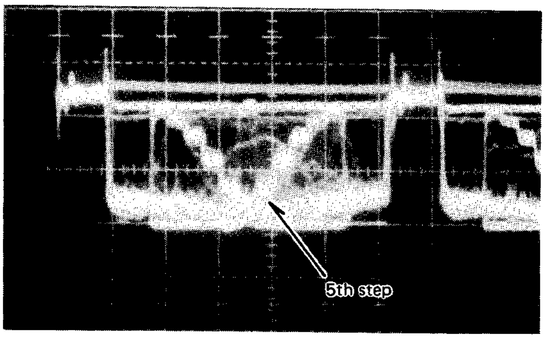


Fig. 78

4) Connect an oscilloscope to TP3 on the video board.
5) Alternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform.

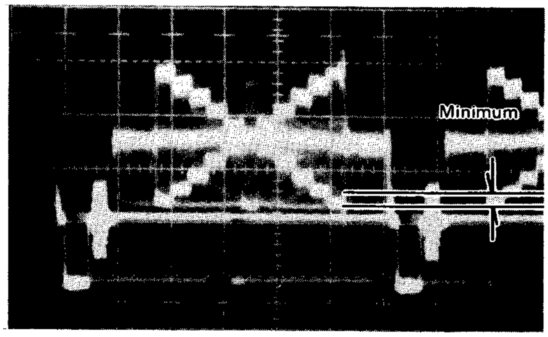


Fig. 79

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.3 V ± 0.02 V.

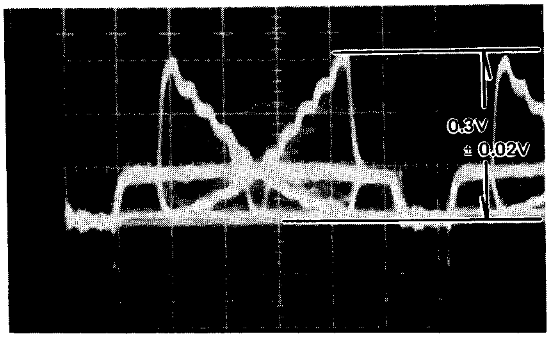


Fig. 80

13. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

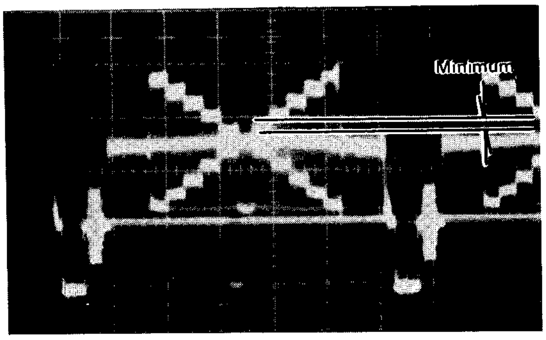
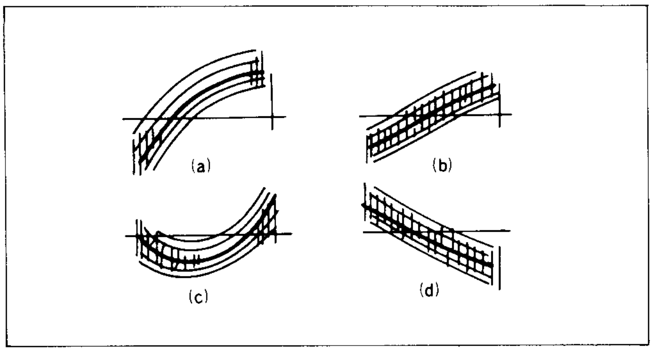


Fig. 81

14. Dynamic focus adjustment

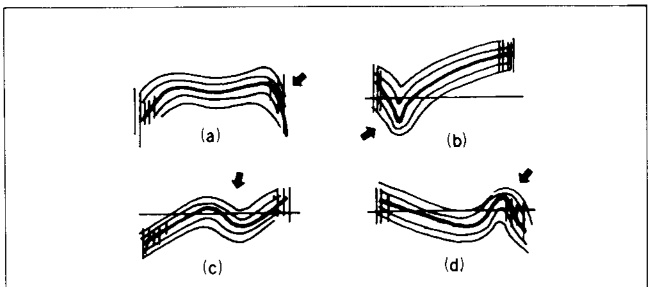
RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP12, TP14: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Connect one channel of an oscilloscope to TP12 (R-YL) on the video board and the other channel to 14 (B-YL).
4) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used) for both channels and set to the DUAL mode.
5) Adjust RVM1-1, RVM1-2 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 82

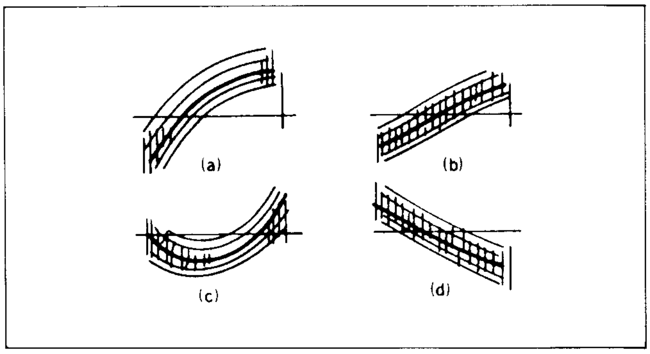


⬅ : Section with correction not applied

Waveform making it difficult to correct shading

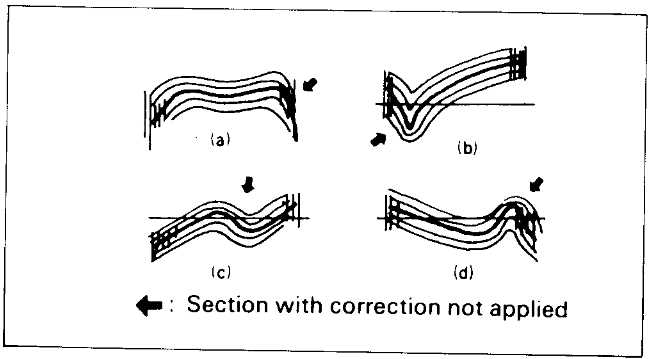
Fig. 83

6) Set an oscilloscope to the V period.
7) Adjust RVM1-3, RVM1-4 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 84



Waveform making it difficult to correct shading

Fig. 85

8) Remove short-circuit.
9) When the waveform making it easy to apply shading correction cannot be obtained by the above adjustment, adjust the field focus in item 9, and then perform adjustment in 7) ~ 9), item 14 again.

15. Red/modulation shading adjustment

RVM3-1, 3-2, 3-3, 3-4: Deflection board
TP12: Video board

1) Shoot the white chart and set the zoom to TELE-PHOTO.
2) Connect an oscilloscope to TP12 on the video board.
3) Set the input range of an oscillorscope to 10 mV/div (10:1 probe used).
4) Adjust RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

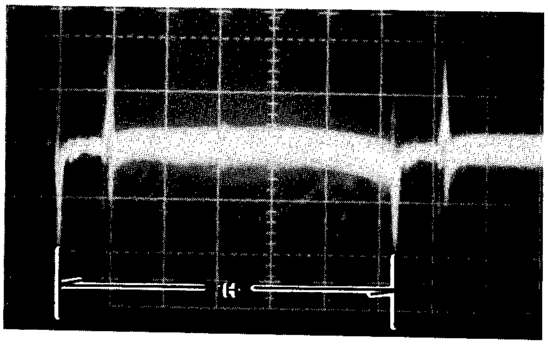


Fig. 86

5) Set an oscilloscope to the V period.
6) Adjust RVM3-3 and RVM3-4 so that the waveform is flat as possible.

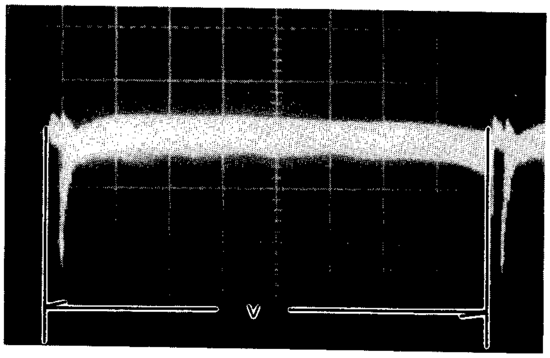


Fig. 87

16. Blue/modulation shading adjustment

RVM4-1, 4-2, 4-3, 4-4: Deflection board
TP14: Video board

1) Shoot the white chart and set the zoom to TELE-PHOTO.
2) Connect an oscilloscope to TP14 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

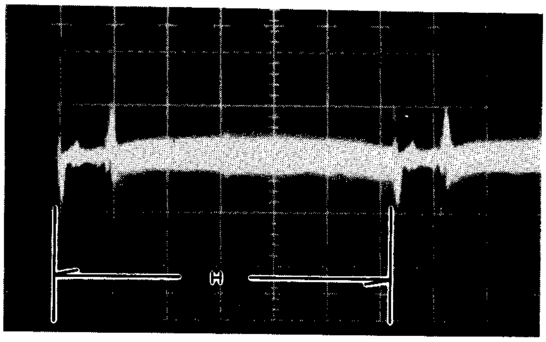


Fig. 88

5) Set an oscilloscope to the V period.
6) Adjust RVM4-3 and RVM4-4 so that the waveform is as flat as possible.

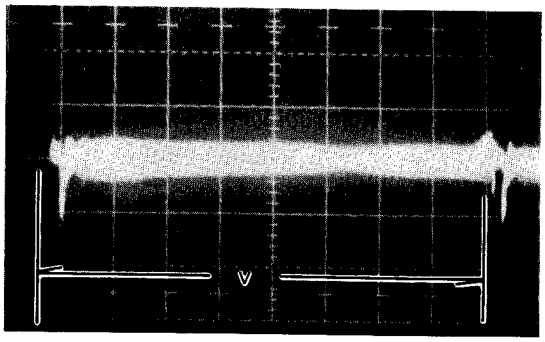


Fig. 89

17. White balance readjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV3 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

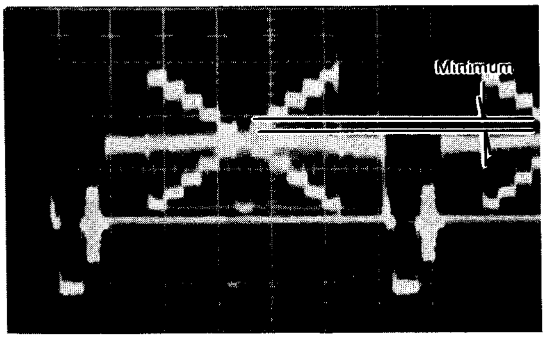


Fig. 90

18. De-γ (Degamma) adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st ~ 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th ~ 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

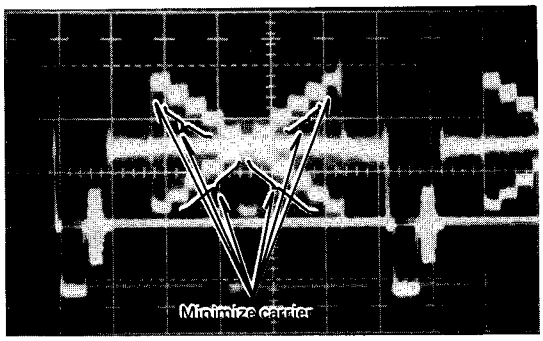


Fig. 91

19. Chroma gain, burst level adjustment

TP3: Video board
RV4, 24, 26: Video board
Iris control: Side of camera

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the color bar chart.
3) Set the white level of the video signal color bar to 1.2 Vp-p using the iris control.
4) Adjust RV24 so that the ratio of the yellow and red carrier levels of the video signal color bar becomes 2:3.
5) Adjust RV26 to set the red carrier level of the waveform to 0.94 Vp-p ± 0.04 V.
6) Adjust RV4 to set the burst level to 0.6 Vp-p ± 0.02 V.
7) Return the iris control to its click position.

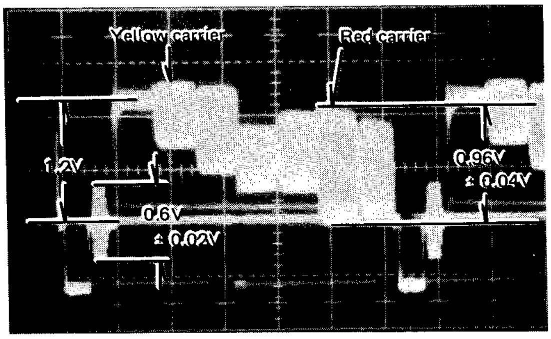


Fig. 92

20. Red phase adjustment

RV21: Video board

1) Shoot the color bar chart.
2) Adjust RV21 so that the tint of the red of both the TV screen and the color bar chart match as mush as possible.

21. Auto white preset adjustment

RV201, 202: Auto white board on the video board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the white chart and set the zoom to TELE-PHOTO.
3) Set the white balance switch to "SET" position.
4) Adjust RV201 and RV202 to minimize the carrier level at the center portion of the video period within 1 second.
   * When the minimized carrier level is not obtained, repeats items 3 and 4.

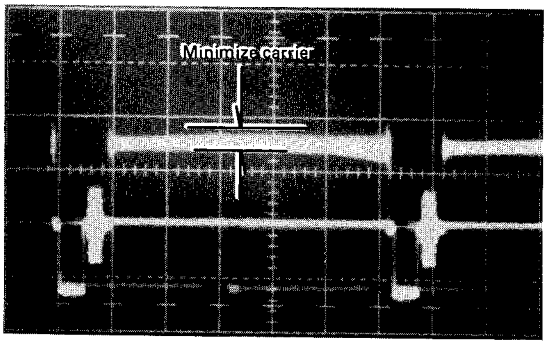


Fig. 93

22. Low light warning indicator level adjustment

RV323: Deflection board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Display the operation check pattern on the viewfinder by pressing the check/normal button.
4) Adjust RV324 so that the video signal level is 0.8 Vp-p ± 0.05 V.
5) Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW".
6) After above adjustment is completed, readjust the video level, item 8.

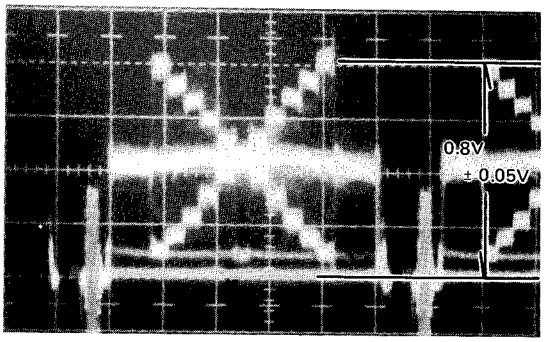


Fig. 94

4. ADJUSTMENT AFTER REPLACING PREAMPLIFIER CIRCUIT BOARD

1. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP2 on the video board.
3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as possible.

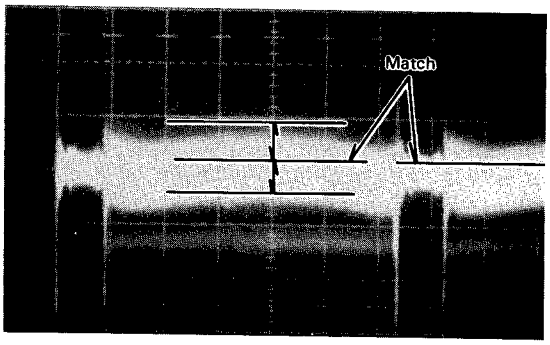


Fig. 101

2. Smear adjustment

CV501: Preamplifier board

This adjustment is performed only when color smear is present. Readjust Chroma carrier level, Black balance. White balance and De-γ (Degamma) again when smear has been adjusted.

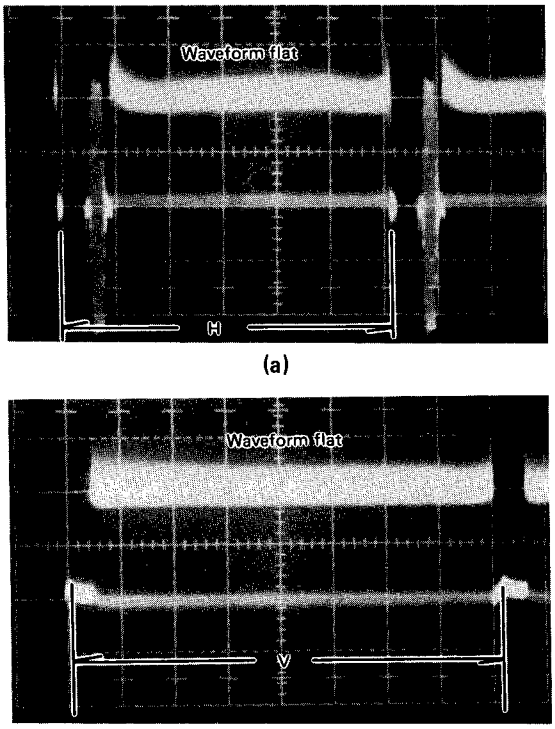
1) Shoot the gray scale chart.
2) Adjust CV501 so that color smear does not occur on the right of the white section of the gray scale on the TV screen.

5. FAULTY SHADING ADJUSTMENT

1. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 on the video board so that the setup level is 0.2 Vp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 111

2. Field focus adjustment

RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP301-305: Deflection board
TP5: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Connect an oscilloscope to TP301 on the deflection board.
3) Preadjust RVM1-1 - RVM1-4 so that the waveform is minimized.
4) Connect an oscilloscope to TP5 on the video board.
5) Shoot a white chart and set the zoom to TELEPHOTO.
6) Adjust RV301 so that the carrier level is max. and the flat range without peaks or troughs is as wide as possible.
   * This is to faciliate shading correction later.

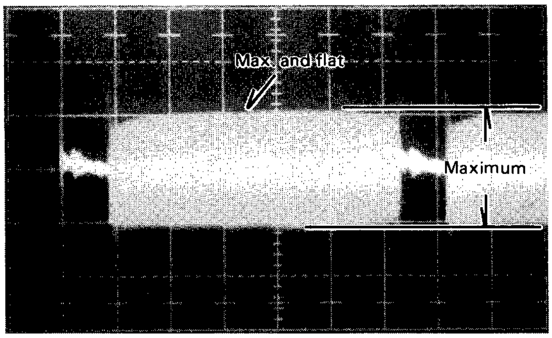


Fig. 112

3. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear.

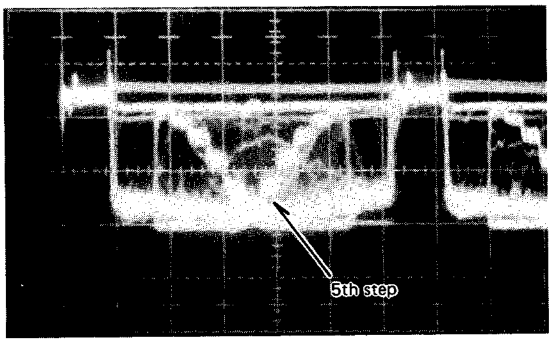


Fig. 113

4) Connect an oscilloscope to TP3 on the video board.
5) Tlternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform.

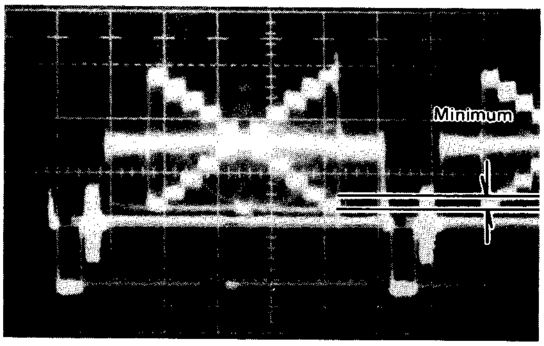


Fig. 114

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.3 V ± 0.02 V.

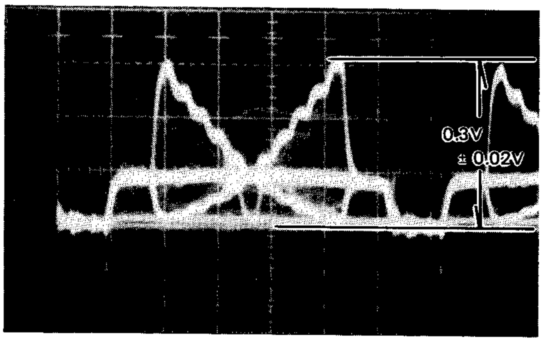


Fig. 115

4. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV3 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

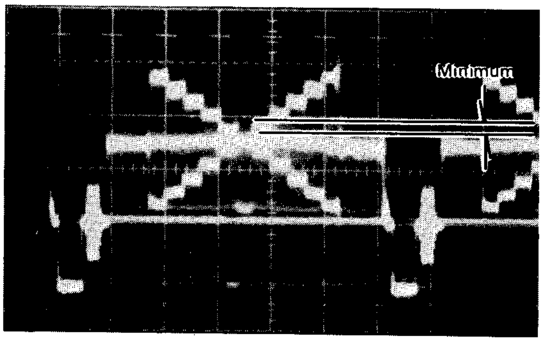
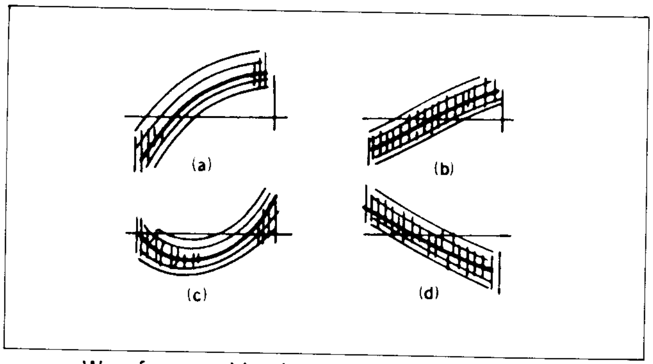


Fig. 116

5. Dynamic focus adjustment

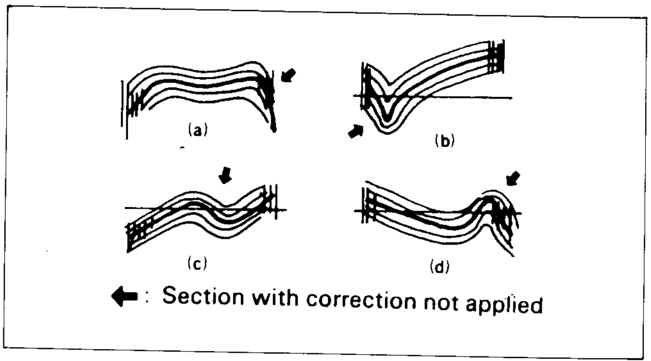
RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP12, TP14: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Shoot the white chart and set the zoom to TELE-PHOTO.
3) Connect one channel of an oscilloscope to TP12 (R-YL) on the video board and the other channel to TP14 (R-YL).
4) Set input range of an oscilloscope to 10 mV/div (10:1 probe used) for both channels and set to the DUAL mode.
5) Adjust RVM1-1, RVM1-2 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 117

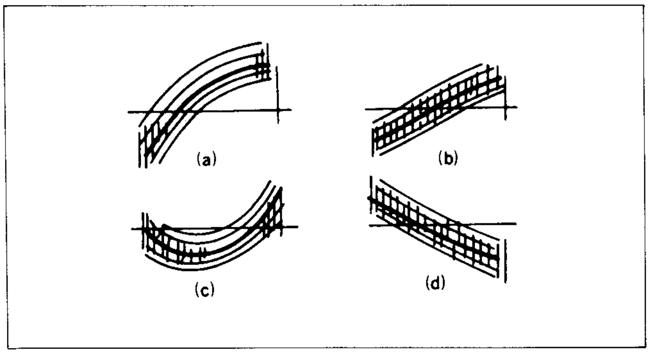


⬅ : Section with correction not applied

Waveform making it difficult to correct shading

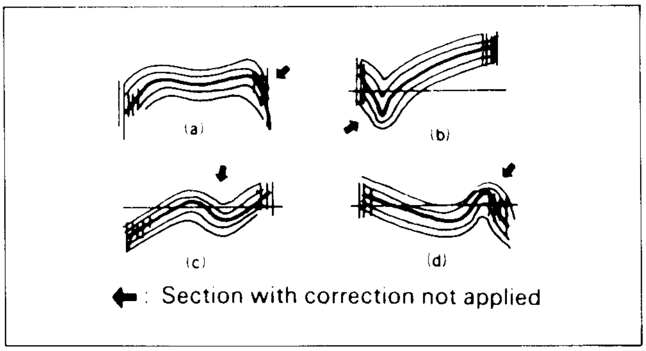
Fig. 118

6) Set an oscilloscope to the V period.
7) Adjust RVM1-3, RV1-4 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it difficult to correct shading

Fig. 119



⬅ : Section with correction not applied

Waveform making it difficult to correct shading

Fig. 120

8) Remove short-circuit.
9) When the waveform making it easy to apply shading correction cannot be obtained by the above adjustment adjust the field focus in item 2, and then adjust as shown in 5) ~ 7), item 5 again.

6. Red/modulation shading adjustment

RVM3-1, 3-2, 3-3, 3-4: Deflection board
TP12: Video board

1) Shoot the white chart and set the zoom to TELE-PHOTO.
2) Connect an oscilloscope to TP12 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

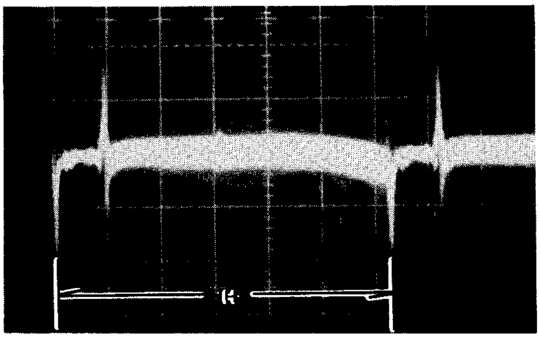


Fig. 121

5) Set an oscilloscope to the V period.
6) Adjust RVM3-3 and RVM3-4 so that the waveform is as flat as possible.

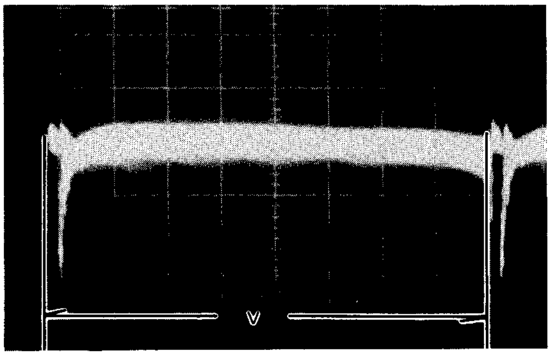


Fig. 122

7. Blue/modulation shading adjustment

RVM4-1, 4-2, 4-3, 4-4: Deflection board
TP14: Video board

1) Shoot the white chart and set the zoom to TELE-PHOTO.
2) Connect an oscilloscope to TP14 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

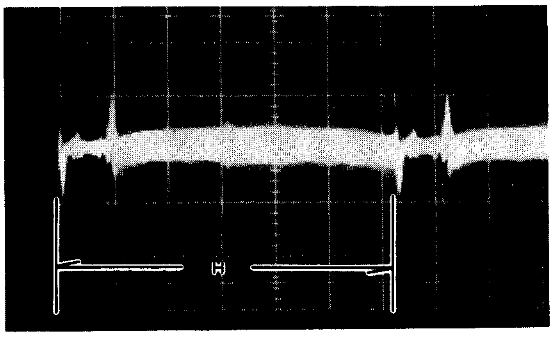


Fig. 123

5) Set an oscilloscope to the V period.
6) Adjust RVM4-3 and RVM4-4 so that the waveform is as flat as possible.

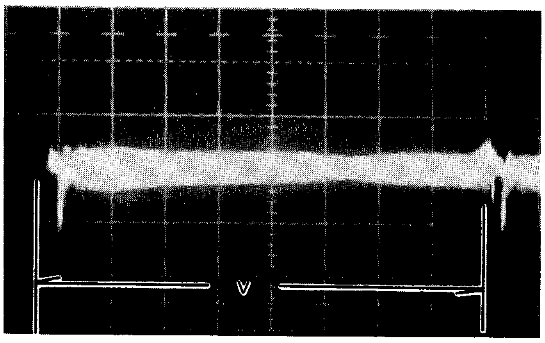


Fig. 124

8. **White balance readjustment**

   TP3: Video board
   RV13, 17: Video board

   1) Connect an oscilloscope to TP3 on the video board.
   2) Shoot the gray scale chart.
   3) Alternately adjust RV3 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

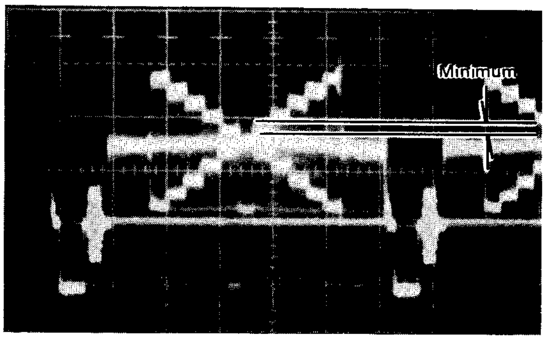


Fig. 125

9. **De-γ (Degamma) Adjustment**

   TP3: Video board
   RV10 ~ 12, RV14 ~ 16: Video board

   1) Connect an oscilloscope to TP3 on the video board.
   2) Shoot the gray scale chart.
   3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st – 5th steps from the bottom of the staircase waveform.
   4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th – 10th steps from the bottom of the staircase waveform.
   5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

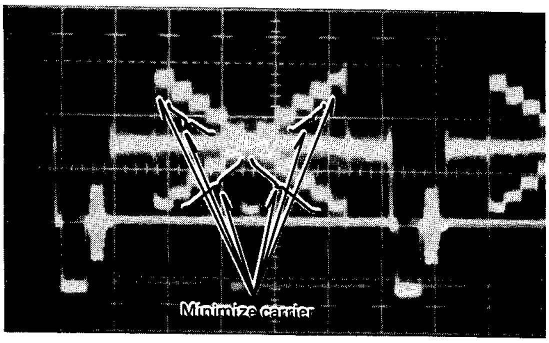


Fig. 126

6. ADJUSTMENT AFTER REPLACING VIEWFINDER CIRCUIT BOARDS

1. Horizontal hold adjustment

RV1151: Viewfinder 2 board
TP1151, 1152: Viewfinder 2 board

1) Short between TP1151 and TP1152.
2) Adjust RV1151.
3) Remove short-circuit.

2. Vertical hold adjustment

RV1152: Viewfinder 2 board
TP1151, 1152, 1154: Viewfinder 2 board

1) Short between TP1151 and TP1152.
2) Connect a frequency counter to TP1154 on the viewfinder 2 board.
3) Adjust RV1152 so that the frequency counter indicates
   45.5 Hz ± 3 Hz
4) Remvoe short-circuit.

3. Centering adjustment

Set the raster position using the centering magnet attached to the deflection yoke.

4. Horizontal size adjustment

LV1101: Viewfinder 1 board

1) Shoot the test chart A.
2) Adjust LV1101 so that the horizontal size of the viewfinder screen matches to the horizontal size of the TV screen.

5. Vertical size adjustment

RV1153: Viewfinder 2 board

1) Shoot the test chart A.
2) Adjust RV1153 so that the circle on the TV screen is symmetrical to the left and right.

6. Brightness adjustment

RV1101: Viewfinder 1 board
TP1101, 1102: Viewfinder 1 board

1) Shoot the test chart A.
2) Turn RV1101 fully counterclockwise.
3) Connect a DC voltmeter to TP1101 and TP1102.
4) Adjust RV1102 so that the DC voltmeter indicates 2.3 V.

7. Contrast adjustment

RV1101: Viewfinder 1 board
TP1101, 1102: Viewfinder 1 board

1) Shoot the test chart A.
2) Connect a DC voltmeter to TP1101 and TP1102.
3) Adjust RV1101 so that the DC voltmeter indicates 3.4 V.

8. Focus adjustment

RV1103: Viewfinder 1 board

1) Shoot the test chart A.
2) Adjust RV1103 so that the sharpness of the picture is best.

7. AUTO FOCUS ADJUSTMENT

1. Focus adjustment

1) Remove the cap. (Fig. 127)
2) Shoot the camera at adjustment chart (B).
   (Illumination of the chart approx, 300 Lux with tungsten lamp.)
3) Set the distance between the chart and the camera lens to 5 m.
4) Focus distance of zoom : 51 mm.
5) Turn the adjustment screw and bring the chart into focus. (Fig.128)
   When the focus is shifted to the infinitive (∞) side, turn the screw clockwise.
   When the focus is shifted to the MACRO side, turn it counterclockwise.
6) Shoot the camera at adjustment chart (C).
7) Set the distance between the chart and the camera lens to 2 m.
8) Adjust as in item 5).
9) When the camera is aimed at charts (B) and (C), both should be in focus.

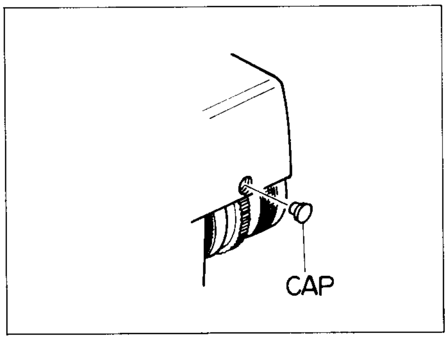


Fig. 127

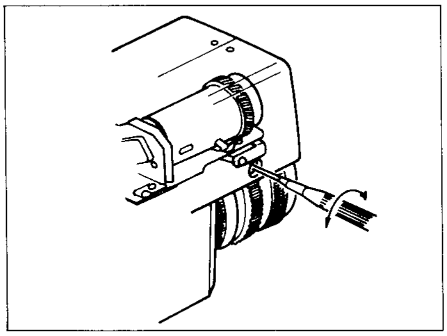
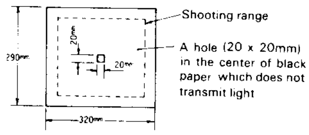
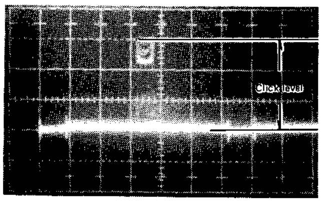


Fig. 128

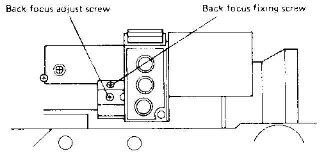
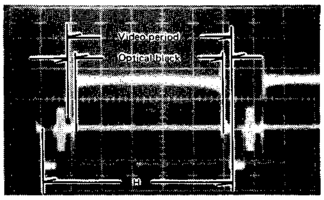
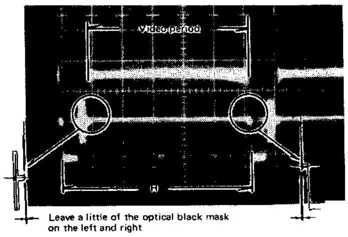
ADJUSTMENT LIST

Purpose of adjustment and picture phenomena are arranged in the order circuit No. purpose of adjustment and picture phenomena.

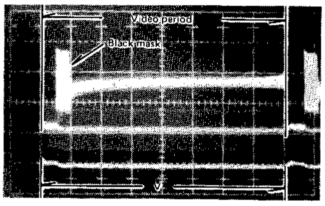
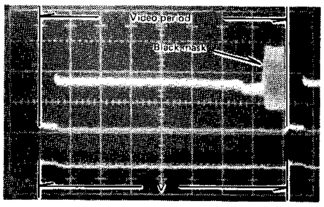
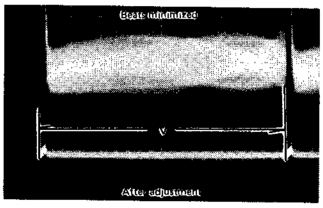
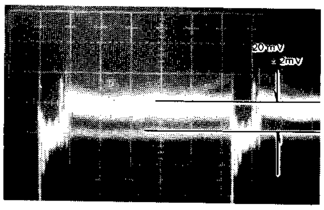
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Beam voltage adjustment	RV302, 326 To adjust electron beam amount of SATICON by varying G1 voltage. ● When the voltage is too low: The high bright (white) sections of the gray scale cannot be discriminated. When the voltage is lowered further, picture does not appear. ● When the voltage is too high: Magenta ghost appears to the right side of the high bright (white) section of the gray scale. Or, horizontal green color appears in that section. Shading amount increases.	TV screen	LV301, RV303 ~ 306 Deflection board	Shoot the test chart A. Adjust LV301, RV303 ~ 306 when the circle of the chart is not round. The adjustment is not required when the circle is approximately round. Adjust the following: RV304: Horizontal centering LV301: Horizontal size (wide) RV303: Horizontal linearity RV306: Vertical centering RV305: Vertical size (height)
			TP1 Video board	RV302 Deflection board	Turn RV326 fully counterclockwise. Shoot the chart shown in the diagram. 1 Shooting range 2 Provide a hole (20 x 20 mm) at the center of a black paper which does not transmit light.  Shooting range A hole (20 x 20mm) in the center of black paper which does not transmit light 290mm 20mm 20mm 320mm Adjust the clip level of the waveform using RV302 and set it to 1.5 Vp-p ± 0.05V. 
				RV326 Deflection board	Adjust RV326 so that the clip level of the beam is 2.4 Vp-p ± 0.1V.
2.	Back-focus adjustment	Back-focus adjustment screw ● To adjust that focusing is obtained when the zoom is set to TELE and WIDE. ● Focus is drifted when the zoom is operated.	TV screen	Back-focus adjusting screw	Set the distance between the color viewer and camera to 3 m. Shoot the test chart A. 1. Zoom: TELEPHOTO Focusing: Focus of lens 2. Zoom: WIDE Focusing: Focus adjusting screw (with focus adjusting screw loose) Adjust TELEPHOTO and WIDE repeatedly. Check that focus is obtained at both TELEPHOTO and WIDE when the distance 10 m or more is shot with the scale set to " ∞ ".

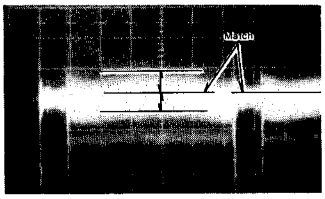
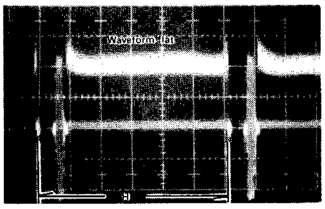
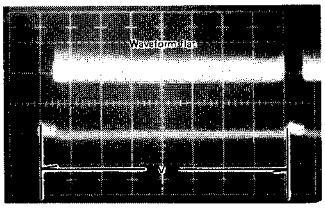
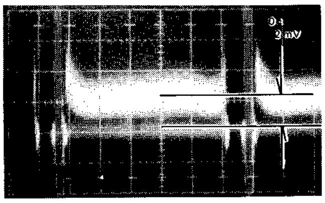
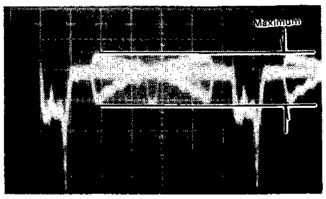
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 Tighten the focus fixing screw after adjustment.
3.	Horizontal size/linearity/ centering adjustment	LV301 To adjust horizontal deflection size. ● The circle chart is distorted. Color balance is not obtained but changes to green. ● Color beat increases.	TP3 Video board	LV301 Deflection board	Shoot white chart. Zoom: TELEPHOTO Adjust LV301 to shorten the waveform width. 
		RV304 To adjust horizontal deflection position. ● Black mask appears on the left or right of the screen.		RV304 Deflecton board	Adjust RV304 so that the optical black mask is symmetrical on the left and right.
		RV303 To adjust horizontal deflection linearity. ● The circle chart is distorted. Color unevenness appears on the left or right. ● Color beat increases.	TV screen	RV303 Deflection board	Shoot the test chart A. Adjust RV303 so that the circle on the TV screen is symmetrical on the left and right.
			TP3 Video board	LV301 (RV304)	Shoot the white chart. Zoom: TELEPHOTO Adjust LV301 so that a little optical black mask remains on the left and right. Fine adjust RV304 so that the optical black mask is symmetrical on the left and right.  Leave a little of the optical black mask on the left and right
4.	Vertical size/centering adjustment	RV305 To adjust vertical deflection size. ● The circle chart is distorted (becomes an ellipse). RV306 To adjust vertical deflection centering. ● The circle chart is distorted. Green mask appears at the top or bottom of the screen.	TP3 Video board	RV305 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the oscilloscope to the V period. Adjust RV305 to shorten the waveform width and make the black mask appear on the left and right.

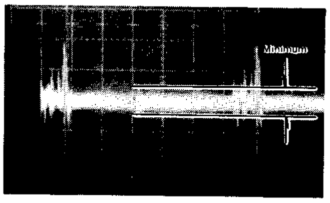
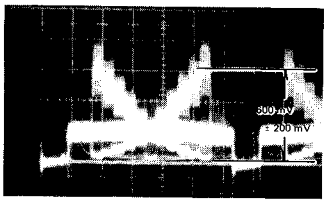
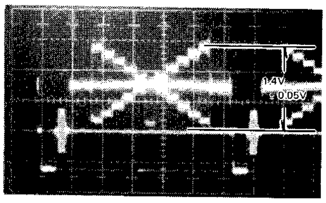
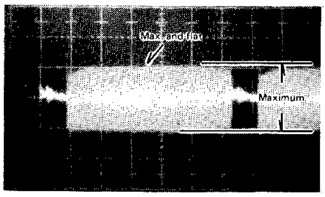
1. **Adjustment after replacing camera tube/coil ass'y**

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 
				RV306 Deflection board	Adjust RV306 so the black mask is symmetrical on the left and right.
			TP1 Video board	RV306 (RV306)	Adjust RV305 to minimize waveform beats. Fine adjust RV306 so that the black mask is symmetrica on the left and right. 
5.	Bias light adjustment	RV325 To adjust bias light potential. ● When the voltage is too low, residual image increases under lower illumination. ● When the voltage is too high, shading amount increases.	TP1 Video board	RV325 Deflection board	Fit the lens cap. Set the probe to 1 : 1 and connect to TP1 via a resistor. Adjust the level nearer to the center using RV325 so that it is 20 mVp-p ± 2 mV. 
6.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible.

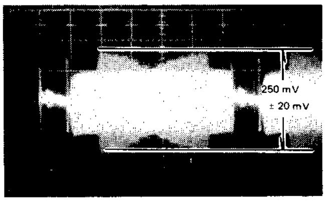
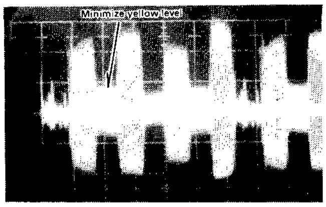
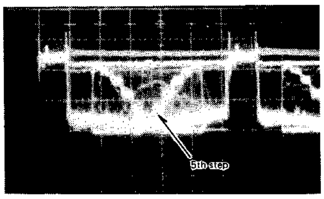
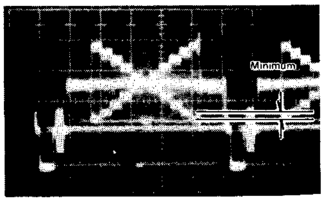
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
7.	Dark shading adjustment	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance uneveness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board RVM2-1, 2-2 Deflection board	Fit the lens cap. Preadjust RV6 so that the setup level is 0.2 Vp-p. Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 
				RVM2-3, 2-4 Deflection board	Set an oscilloscope to the V period. Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
8.	Y setup adjustment	RV6 To adjust setup of the luminance signal. ● Picture becomes whitish or seems sunk.	TP3 Video board	RV6 Video board	Fit the lens cap. Adjust setup using RV6 to set to 0 mVp-p ± 20 mV. 
9.	Edge balance adjustment	RV27, 29 To adjust so that only the vertical edge signal is mixed with the luminance signal. ● The whole screen becomes red or green.	TP17 Video board	RV27 Video board	Shoot the gray scale chart. Adjust RV27 to maximize the waveform. 

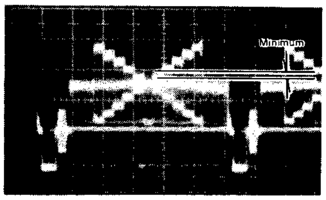
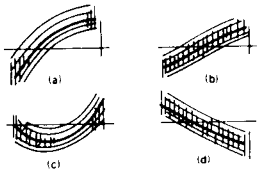
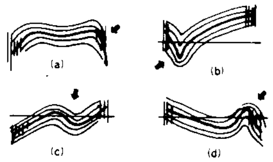
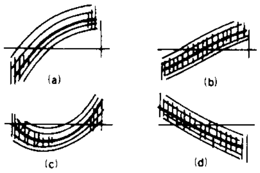
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
				RV29 Video board	Adjust RV29 to minimize the waveform. 
10.	Video level adjustment	RV324 To set the balance point of the automatic iris control to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP1 Video board	RV324 Deflection board	Shoot the gray scale chart. Adjust the video signal component of the waveform using RV324 and set it to 60 mVp-p ± 20 mV. 
		RV2 To set the balance point of the AGC circuit to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP3 Video board	RV2 Video board	Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05V. 
11.	Field focus adjustment	RV301 To adjust the focus electrode voltage of the SATICON so that the electron beam output from the cathode is focused on the photoconductive film. ● Focus is not obtained when the focus ring or the focus adjusting screw of the lens is turned. ● Picture becomes greenish.	TP301 Deflection board TP302 ~ TP305 Deflection board	RVM1-1, 1-2, 1-3, 1-4 Deflection board	Short between TP302 and TP303 and between TP304 and TP305. Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
			TP5 Video board	RV301 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Adjust RV301 so the carrier level is max. and flat without peaks and troughs. 

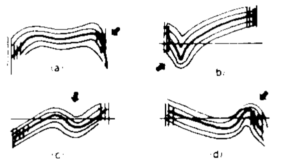
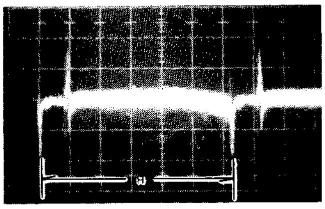
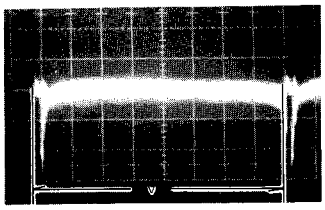
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
12.	Chroma carrier level adjustment	RV3 To adjust the carrier level of the chroma signal. ● No color, tint abnormal.	TP5 Video board	RV3 Video board	Shoot the gray scale chart. Adjust RV3 to set to 250 mVp-p ± 20 mV. 
13.	Color separation adjustment	RV7 To adjust the carrier phase shift with the R/B separation circuit. ● Color reproduction faulty. Mixed color. RV8 To adjust the 1H delayed carrier level of the chroma signal and match it with the chroma signal carrier level of the phase shifter output. ● Color saturation and purity are deteriorated causing mixing of colors.	TP7 Video board	RV7, 8 Video board	Shoot the color bar chart. Adjust RV7 and RV8 alternately to minimize yellow level of the waveform. 
14.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the birghtness of the object. RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow. RV23 To adjust setup of the R signal. ● The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. ● The dark portion of the picture becomes discolored.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear. 
			TP3 Video board	RV22, 23 Video board	Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase wave. 
			Pin 6 of IC3	RV30 Video board	Adjust RV30 so that the staircase wave level from the pedestal is 0.3 Vp-p ± 0.02V.

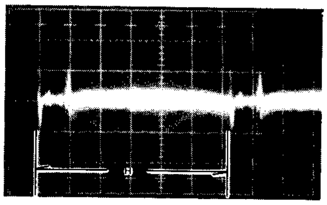
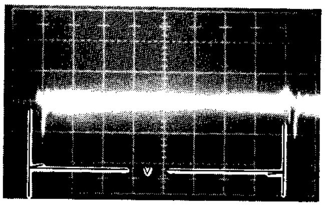
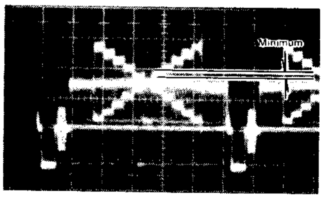
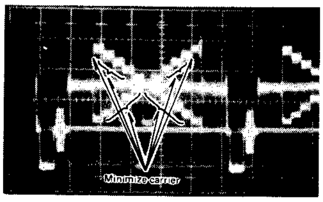
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
15.	White balance adjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
16.	Dynamic focus adjustment	RVM1-1, 1-2, 1-3, 1-4 To correct the peripheral beam focusing of the SATICON. To adjust the amount of dynamic focus. ● Color unevenness increase.	TP302 ~ TP305 Deflection board TP12 Video board TP14 Video board	RVM1-1, 1-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Short between TP302 and TP303 and between TP304 and TP305. Set the input range of both channels of the oscilloscope to 10 mV/div (probe: 10 : 1) and set to DUAL mode. Adjust the waveform using RVM1-1 and RVM1-2 so that it is easy to correct shading.  Waveform making it easy to correct shading.  ← : Section with correction not applied Waveform making it difficult to correct shading.
				RVM1-3, 1-4, RV301 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM1-3, RVM1-4 and RV301 so that it is easy to correct shading.  Waveform making it easy to correct shading.

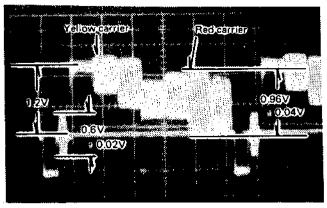
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 ← Section with correction not applied Waveform making it difficult to correct shading. Remove short-circuit.
					* When the waveform easy to correct shading is not obtained by the adjustment shown above, adjust the field focus in item 11, and then perform adjustment shown in item 16 again.
17.	Red/ modulation shading	RVM3-1, 3-2, 3-3, 3-4 To correct R signal color unevenness.	TP12 Video board	RVM3-1, 3-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10: 1). Adjust the waveform using RVM3-1 and RVM3-2 so that the waveform is as flat as possible. 
				RVM3-3, 3-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM3-3 and RVM3-4 so that the waveform is as flat as possible. 
18.	Blue/ modulation shading adjustment	RVM4-1, 4-2, 4-3, 4-4 To correct B signal color unevenness. ● Color unevenness increases.	TP12 Video board	RVM4-1, 4-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

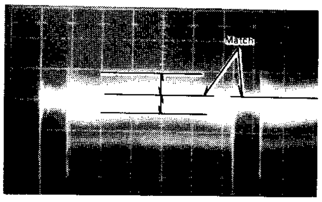
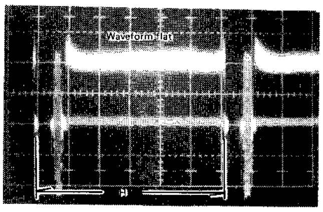
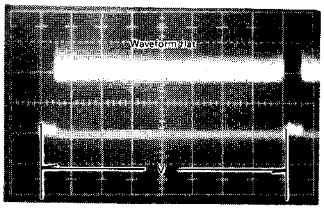
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
				RVM4-3, 4-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM4-3 and RVM4-4 so that the waveform is as flat as possible. 
19.	White balance readjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
20.	De-γ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal. ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RVM12, 16 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave.
				RV11, 15 Video board	Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform.
				RV10, 14 Video board	Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the top of the staircase waveform. 

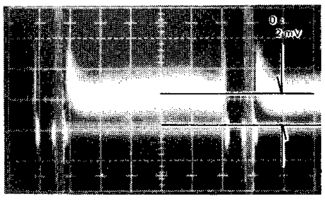
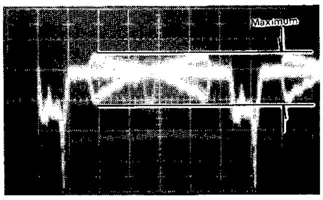
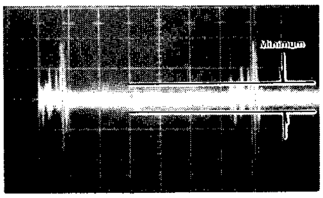
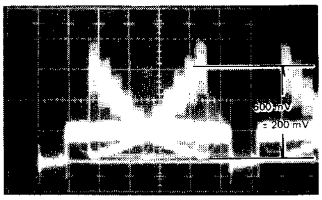
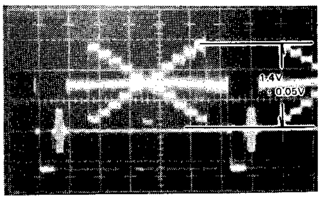
1. Adjustment after replacing camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
21.	Chroma gain/burst level adjustment	RV24 To adjust the ratio of the color saturation with red and blue color. ● Red or blue color gets less dense. ● Color gets too dense and color noise becomes conspicuous. RV26 To match the color saturation. ● Color gets less dense. Or, it gets too dense and color noise becomes conspicuous. RV4 To adjust the burst level. ● Not colored or color gets too dense.	TP3 Video board	Iris control at side of camera RV24 Video board RV26 Video board RV4 Video board	Shoot the color bar chart. Adjust the white level of the color bar using the iris control to set to 1.2 Vp-p. Adjust the ratio of the yellow and red carrier levels to set to 2 : 3. Adjust the red carrier level of the waveform using RV26 to set to 0.94 Vp-p ± 0.04V. Adjust the burst level of the waveform using RV4 to set to 0.6 Vp-p ± 0.02V. Return the iris control to its click position. 
22.	Red phase adjustment	RV21 To match the red phase. ● The red phase does not match the object.	TV screen	RV21 Video board	Shoot the color bar chart. Adjust tint using RV21 so that tints of the chart and the TV picture match.
23.	Smear adjustment	CV501 To correct frequency response of the preamplifier. ● Green or magenta smear occurs on the right side of bright white sections.	TV screen	CV501 Preamplifier board	Perform this adjustment only when color smear occurs. When smear is adjusted, readjust the chroma carrier level, black balance, white balance and degamma. Shoot the gray scale chart so that it fills the TV screen. Adjust color smear using CV501 so that color smear is not present on the right white section of the gray scale of the TV screen.

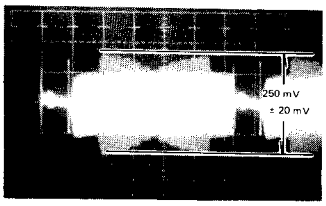
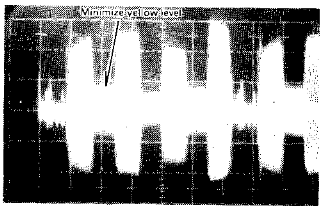
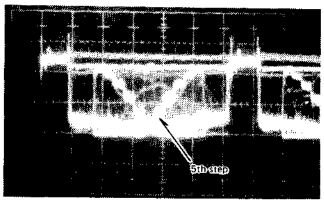
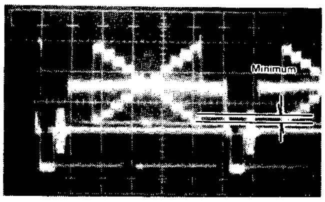
2. Adjustment after replacing video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Sub-carrier frequency adjustment	CV251 To adjust the oscillation frequency of the sync generator. ● Color ficker, no color or tint drifts or different color appears.	TV16 Video board	CV251 Video board	Adjust CV251 so that the frequency counter indicates 4.433619 MHz ± 100 Hz.
2.	PLL adjustment	LV251 To adjust to provide the interleaved relation between the horizontal sync signal and sub-carrier signal. ● Picture fluctuated, sync distorted, no color, tint greatly drift, color beats.	TP251 SSG board	LV251 SSG board	Adjust LV251 so that the DC voltmeter indicates 3.0V ± 0.1V.
3.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible. 
4.	Dark shading	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance unevenness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board	Fit the lens cap. Preadjust RV6 so that the setup level is 0.2 Vp-p.
				RVM2-1, 2-2 Deflection board	Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 
				RVM2-3, 2-4 Deflection board	Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
5.	Y setup adjustment	RV6 To adjust setup of the luminance signal. ● Picture becomes whitish or seems sunk.	TP3 Video board	RV6 Video board	Fit the lens cap. Adjust setup using RV6 to set to 0 mVp-p ± 20 mV.

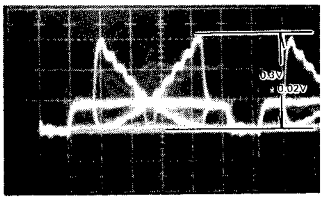
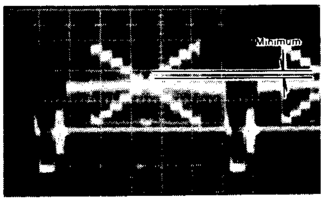
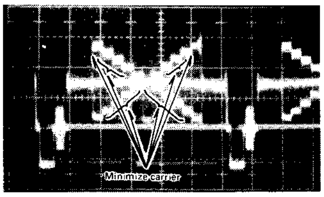
2. Adjustment after replacing video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
6.	Edge balance adjustment	RV27, 29 To adjust so that only the vertical edge signal is mixed with the luminance signal. ● The whole screen becomes red or green.	TP17 Video board	RV27 Video board	Shoot the gray scale chart. Adjust RV27 to maximize the waveform. 
			TP18 Video board	RV29 Video board	Adjust RV29 to minimize the waveform. 
7.	Video level adjustment	RV324 To set the balance point of the automatic iris control to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated. RV2 To set the balance point of the AGC circuit to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP1 Video board	RV324 Deflection board	Shoot the gray scale chart. Adjust the video signal component of the waveform using RV324 and set it to 600 mVp-p ± 20 mV. 
			TP3 Video board	RV2 Video board	Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05V. 

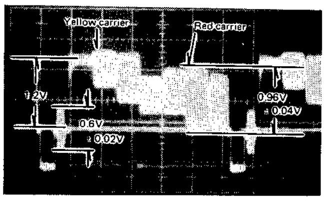
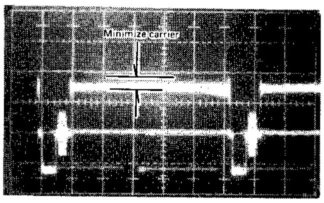
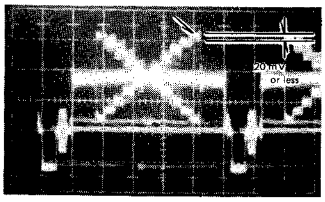
2. Adjustment after replacing video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
8.	Chroma RV3 carrier level adjustment	To adjust the carrier level of the chroma signal. ● No color, tint abnormal.	TP5 Video board	RV3 Video board	Shoot the gray scale chart. Adjust RV3 to set to 250 mVp-p ± 20 mV. 
9.	Color separation adjustment	RV7 To adjust the carrier phase shift with the R/B separation circuit. ● Color reproduction faulty. Mixed color. RV8 To adjust the 1H delayed carrier level of the chroma signal and match it with the chroma signal carrier level of the phase shifter output. ● Color saturation and purity are deteriorated causing mixing of colors.	TP7 Video board	RV7, 8 Chroma board	Shoot the color bar chart. Adjust RV7 and RV8 alaternately to minimize yellow level of the waveform. 
10.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the brightness of the object. RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow. RV23 To adjust setup of the R signal. ● The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. ● The dark portion of the picture becomes discolored.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear. 
			TP3 Video board	RV22, 23 Video board	Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase wave. 
			Pin 6 of IC3 Video board	RV30 Video board	Adjust RV30 so that the staircase wave level from the pedestal is 0.3 Vp-p ± 0.02V.

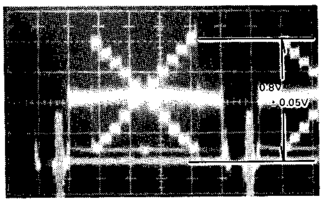
2. Adjustment after replacing video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
11.	White balance adjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
12.	De-γ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal. ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RV12, 16 Video board RV11, 15 Video board RV10, 14 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave. Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform. Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the top of the staircase waveform. 
13.	Vertical false signal elimination adjustment	RV28 To decrease the amount of the Vertical false signal. ● Vertical false becomes conspicuous.	TV screen	RV28 Video board	Shoot the gray scale chart. Adjust RV28 so that the vertical false signal on the bottom of gray scale on the TV screen is minimized.
14.	Chroma gain/burst level adjustment	RV24 To adjust the ratio of the color saturation with red and blue color. ● Red or blue color gets less dense. ● Color gets too dense and color noise becomes conspicuous.	TP3 Video board	Iris control at side of camera RV24 Video board	Shoot the color bar chart. Adjust the white level of the color bar using the iris control to set to 1.2 Vp-p. Adjust the ratio of the yellow and red carrier levels to set to 2 : 3.

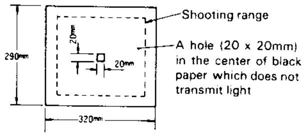
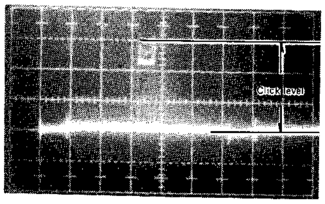
2. Adjustment after replacing video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		RV26 To match the color saturation. ● Color gets less dense. Or it gets too dense and color noise becomes conspicuous.		RV26 Video board RV4 Video board	Adjust the red carrier level of the waveform using RV26 to set to 0.94 Vp-p ± 0.04V. Adjust the burst level of the waveform using RV4 to set to 0.6 Vp-p ± 0.02V. Return the iris control to its click position. 
15.	Red phase adjustment	RV21 To match the red phase. ● The red phase does not match the object.	TV screen	RV21 Video board	Shoot the color bar chart. Adjust tint using RV21 so that tints of the chart and the TV picture match.
16.	Auto white preset adjustment	RV201 To adjust the balance of R and YL signal during auto white set. ● Picture becomes reddish or greenish. RV202 To adjust the balance of B and YL signals during auto white set. ● Picture becomes bluish or greenish.	TP3 Video board	RV201, 202 Auto white board	Shoot the white chart. Zoom: TELEPHOTO White balance: SET Adjust RV201 and RV202 to minimize the carrier level at the center portion of the video period within 1 second. * When the minimized carrier level is not obtained, repeat adjustment. 
17.	Chroma killer adjustment	RV25 To adjust the level so that the chroma is killed at the high-light portion which is higher than the prescribed level. ● The high-light portion becomes green. ● No color.	TP3 Video board	Iris control at side of camera RV25 Video board	Shoot the gray scale chart. Indoor/outdoor: OUTDOOR Adjust the iris control to clip the 1st step from the top of the staircase waveform. Adjust RV25 so that the carrier level at the clipped 1st step is 20 mVp-p or less. Return the iris control to iris lock position and the indoor/outdoor to INDOOR position. 

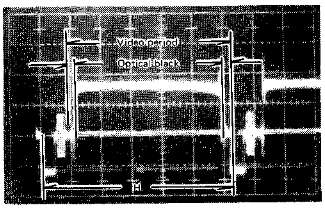
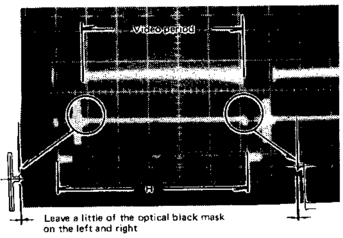
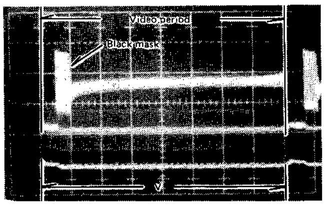
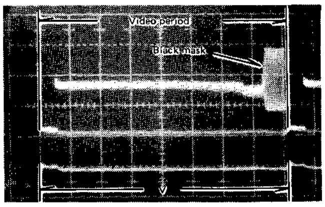
2. Adjustment after replacing video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
18.	Negative video color phase adjustment	RV20 To adjust the color phase when the negative/positive switch is placed into "NEG". ● Color phase of the negative video differs.	TV screen	RV20 Video board	Shoot the color bar chart. Negative/positive: NEG Adjust RV20 so that the tint at the right end section of the color bar of the TV screen match to the tint at yellow of the color bar chart.
19.	Low light warning indicator level adjustment	RV323 To set the level of the low light warning display. ● The graphics "LIGHT LOW" are not displayed when the video signal decreases. The graphics "LIGHT OK" are not displayed when the video signal increases.	TP3 Video board	RV324 Deflection board	Shoot the gray scale chart. Display: Check pattern (by pressing the check/normal button) Adjust RV324 so that the video signal is 0.8 Vp-p ± 0.05V.
				RV323 Deflection board	Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW". 

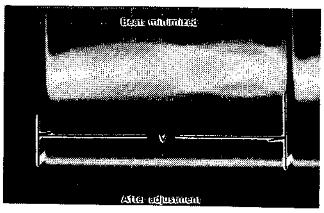
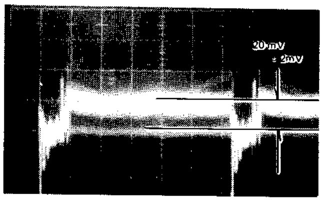
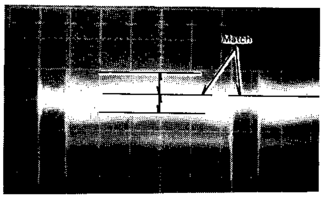
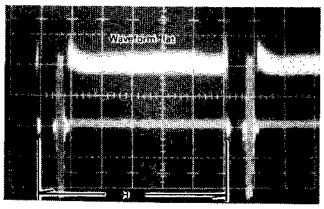
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Power voltage adjustment	RV451, 452, 453, 454 To set the power voltages. ● Picture becomes abnormal. Microprocessor malfanctions.	TP306 Deflection board	RV451 Deflection board	Adjust RV451 so that the DC voltmeter indicates 9.0V ± 0.01V.
			TP308 Deflection board	RV452 Deflection board	Adjust RV452 so that the DC voltmeter indicates 5.0V ± 0.01V.
			TP307 Deflection board	RV453 Deflection board	Adjust RV453 so that the DC voltmeter indicates 5.0V ± 0.01V.
			TP309 Deflection board	RV454 Deflection board	Adjust RV454 so that the DC voltmeter indicates 5.1V ± 0.01V.
2.	Beam voltage adjustment	RV302, 326 To adjust electron beam amount of SATICON by varying G1 voltage. ● When the voltage is too low: The high bright (white) sections of the gray scale cannot be discriminated. When the voltage is lowered further, picture does not appear. ● When the voltage is too high: Magenta ghost appears to the right side of the high bright (white) section of the gray scale. Or, horizontal green color appears in that section. Shading amount increases.	TV screen	LV301, RV303 ~ 306 Deflection board	Shoot the test chart A. Adjust LV301, RV303 ~ 306 when the circle of the chart is not round. This adjustment is not required when the circle is approximately round. Adjust the following: RV304: Horizontal centering LV301: Horizontal size (wide) RV303: Horizontal linearity RV306: Vertical centering RV305: Vertical size (height)
			TP1 Video board	RV302 Deflection board	Turn RV326 fully counterclockwise. Shoot the chart shown in the diagram. 1 Shooting range 2 Provide a hole (20 x 20 mm) at the center of a black paper which does not transmit light.  Shooting range A hole (20 x 20mm) in the center of black paper which does not transmit light 290mm 20mm 20mm 320mm Adjust the clip level of the waveform using RV302 and set it to 1.5 Vp-p ± 0.05V. 
				RV326 Deflection board	Adjust RV326 so that the clip level of the beam is 2.4 Vp-p ± 0.1V.
3.	Horizontal size/linearity/ centering adjustment	LV301 To adjust horizontal deflection size. ● The circle chart is distorted. Color balance is not obtained but changes to green.	TP3 Video board	LV301 Deflection board	Shoot white chart. Zoom: TELEPHOTO Adjust LV301 to shorten the waveform width.

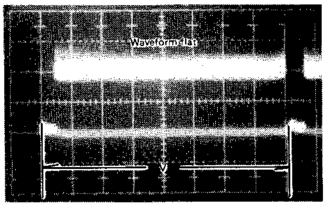
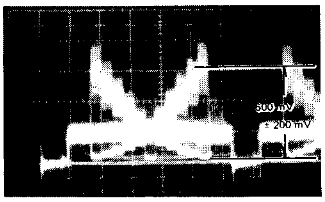
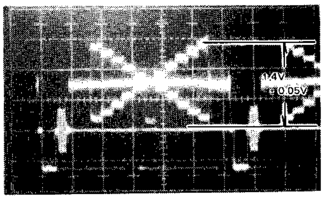
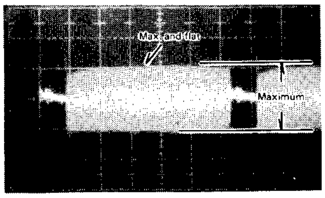
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		● Color beat increases.		RV304 Deflection board	 Adjust RV304 so that the optical black mask is symmetrical on the left and right.
		RV304 To adjust horizontal deflection position.	TV screen	RV303 Deflection board	Shoot the test chart A. Adjust RV303 so that the circle on left and right.
		● Black mask appears on the left or right of the screen. RV303 To adjust horizontal deflection linearity. ● The circle chart is distorted. Color unevenness appears on the left or right. ● Color beat increases.	TP3 Video board	LV301 (RV304)	Shoot the white chart. Zoom: TELEPHOTO Adjust LV301 so that a little optical black mask remains on the left and right. Fine adjust RV304 so that the optical black mask is symmetrical on the left and right.  Leave a little of the optical black mask on the left and right
4.	Vertical size/centering adjustment	RV305 To adjust vertical deflection size. ● The circle chart is distorted (becomes an elipse). RV306 To adjust vertical deflection centering. ● The circle chart is distorted. Green mask appears at the top or bottom of the screen.	TP3 Video board	RV305 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the oscilloscope to the V period. Adjust RV305 to shorten the waveform width and make the black mask appear on the left and right.  

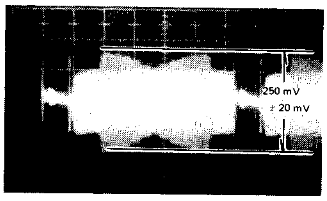
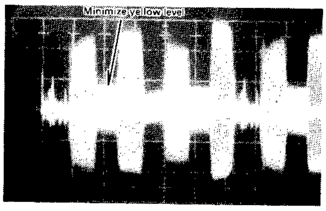
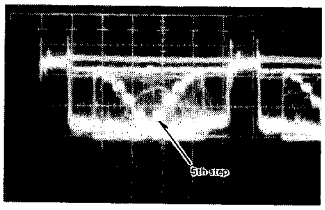
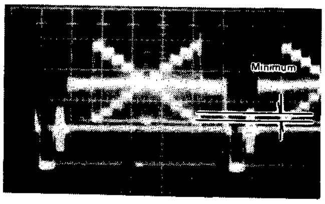
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
				RV306 Deflection board.	Adjust RV306 so the black mask is symmetrical on the left and right.
			TP1 Video board	RV305 (RV306)	Adjust RV305 to minimize waveform. beats. Fine adjust RV306 so that the black mask is symmetrical on the left and right. 
5.	Bias light adjustment	RV325 To adjust bias light potential. ● When the voltage is too low, residual image increases under lower illumination. ● When the voltage is too high, shadingamount increases.	TP1 Video board	RV325 Deflection board	Fit the lens cap. Set the probe to 1 : 1 and connect to TP1 via a resistor. Adjust the level nearer to the center using RV325 so that it is 20 mVp-p ± 2 mV. 
6.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible. 
7.	Dark shading adjustment	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance unevenness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board RVM2-1, 2-2 Deflection board	Fit the lens cap. Preadjust RV6 so that the setup level is 0.2 Vp-p. Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 

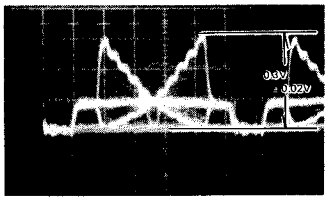
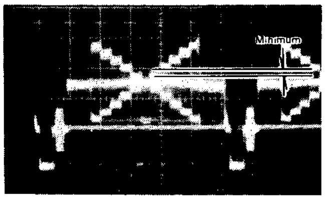
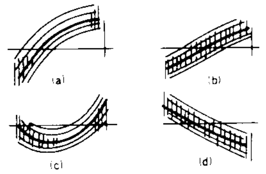
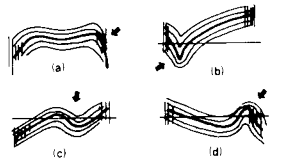
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
				RVM2-3, 2-4 Deflection board	Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
8.	Video level adjustment	RV324 To set the balance point of the automatic iris control to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated. RV2 To settle balance point of the AGC circuit to keep the video level constant.	TP1 Video board	RV324 Deflection board	Shoot the gray scale chart. Adjust the video signal component of the waveform using RV324 and set it to 600 mVp-p ± 20 mV. 
		● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP3 Video board	RV2 Video board	Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05V. 
9.	Field focus adjustment	RV301 To adjust the focus electrode voltage of the SATICON so that the electron beam output from the cathode is focused on the photoconductive film. ● Focus is not obtained when the focus ring or the focus adjusting screw of the lens is turned. ● Picture becomes greenish.	TP301 Deflection board TP302 ~ TP305 Deflection board	RVM1-1, 1-2, 1-3, 1-4 Deflection board	Short between TP302 and TP303 and between TP303 and TP304. Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
			TP5 Video board	RV301 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Adjust RV301 so the carrier level is max. and flat without peaks and troughs. 

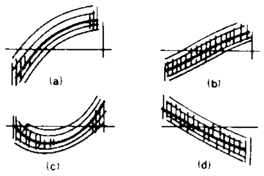
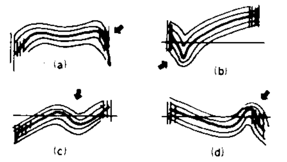
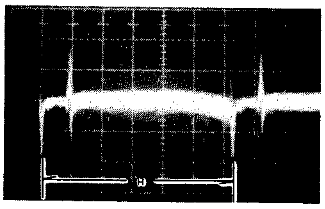
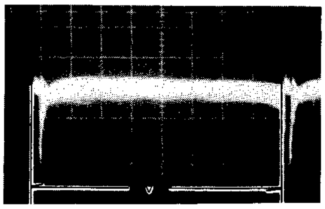
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
10.	Chroma carrier level adjustment	RV3 To adjust the carrier level of the chroma signal. ● No color, tint abnormal.	TP5 Video board	RV3 Video board	Shoot the gray scale chart. Adjust RV3 to set to 250 mVp-p ± 20 mV. 
11.	Color separation adjustment	RV7 To adjust the carrier phase shift with the R/B separation circuit. ● Color reproduction faulty. Mixed color. RV8 To adjust the 1H delayed carrier level of the chroma signal and match it with the chroma signal carrier level of the phase shifter output. ● Color saturation and purity are deteriorated causing mixing of colors.	TP7 Video board	RV7, 8 Video board	Shoot the color bar chart. Adjust RV7 and RV8 alternately to minimize yellow level of the waveform. 
12.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the brightness the object. RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow. RV23 To adjust setup of the R signal. ● The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. ● The dark portion of the picture becomes discolored.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear. 
			TP3 Video board	RV22, 23 Video board	Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase waveform. 
			Pin 6 of IC3	RV30 Video board	Adjust RV30 so that the level from the pedestal staircase waveform is 0.3 Vp-p ± 0.02V.

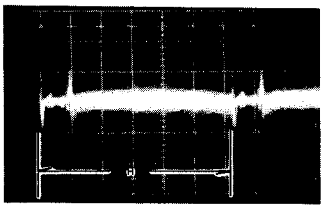
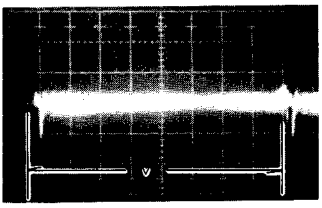
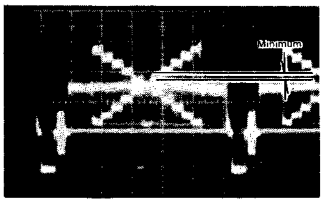
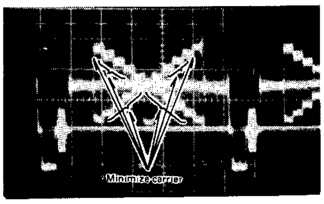
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
13.	White balance adjustment	RV13 To match the YL and R signal lelves and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
14.	Dynamic focus adjustment	RVM1-1, 1-2, 1-3, 1-4 To correct the peripheral beam focusing of the SATICON. To adjust the amount of dynamic focus. ● Color unevenness increases.	TP302 ~ TP305 Deflection board TP12 Video board TP14 Video board	RVM1-1, 1-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Short between TP302 and TP303 and between TP304 and TP305. Set the input range of both channels of the oscilloscope to 10 mV/div (prove: 10 : 1) and set to the DUAL mode. Adjust the waveform using RVM1-1 and RVM1-2 so that it is easy to correct shading.  Waveform making it easy to correct shading.  ⬅ : Section with correction not applied Waveform making it difficult to correct shading.
				RVM1-3, 1-4, RV301 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM1-3, RVM1-4 and RV301 so that it is easy to correct shading.

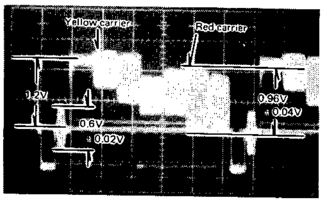
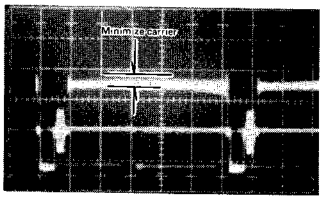
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 Waveform making it easy to correct shading.  ←: Section with correction not applied Waveform making it difficult to correct shading. Remove short-circuit. * When the waveform easy to correct shading is not obtained by the adjustment shown above, adjust the field focus in item 9, and then perform adjustment shown in item 14 gain.
15.	Red/ modulation shading adjustment	RVM3-1, 3-2, 3-3, 3-4 To correct R signal color unevenness. ● Color unevenness increases.	TP12 Video board	RVM3-1, 3-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM3-1 and RVM3-2 so that the waveform it as flat as possible. 
				RVM3-3, 3-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM3-3 and RVM3-4 so that the waveform is as flat as possible. 
16.	Blue/ modulation shading adjustment	RVM4-1, 4-2, 4-3, 4-4 To correct B signal color unevenness. ● Color unevenness increases.	TP12 Video board	RVM4-1, 4-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1).

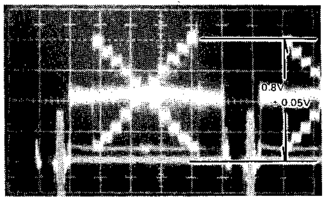
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					Adjust the waveform using RVM4-1 and RVM4-2 so that the waveform is as flat as possible. 
				RVM4-3, 4-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM4-3 and RVM4-4 so that the waveform is as flat as possible. 
17.	White balance readjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
18.	Deγ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal. ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RV12, 16 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave.
				RV11, 15 Video board	Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform.
				RV10, 14 Video board	Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the top of the staircase waveform. 

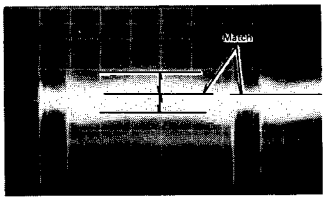
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
19.	Chroma gain/burst level adjustment	RV24 To adjust the ratio of the color saturation with red and blue color. ● Red or blue color gets less dense. ● Color gets too dense and color noise becomes conspicuous. RV26 To match the color saturation. ● Color gets less dense. Or it gets too dense and color noise becomes conspicuous. RV4 To adjust the burst level. ● Not colored or color gets too dense.	TP3 Video board	Iris control at side of camera RV24 Video board RV26 Video board RV4 Video board	Shoot the color bar chart. Adjust the white level of the color bar using the iris control to set to 1.2 Vp-p. Adjust the ratio of the yellow and red carrier levels to set to 2 : 3. Adjust the red carrier level of the waveform using RV26 to set to 0.94 Vp-p ± 0.04V. Adjust the burst level of the waveform using RV4 to set to 0.6 Vp-p ± 0.02V. Return the iris control to its click position. 
20.	Red phase	RV21 adjustment ● The red phase does not match the object.	TV screen	RV21 Video board	Shoot the color bar chart. Adjust tint using RV21 so that tints of the chart and the TV picture match.
21.	Auto white preset adjustment	RV201 To adjust the balance of R and YL signals during auto white set. ● Picture becomes reddish or greenish. RV202 To adjust the balance of B and YL signals during auto white set. ● Picture becomes bluish or greenish.	TP3 Video board	RV201, 202 Auto white board	Shoot the white chart. Zoom: TELEPHOTO White balance: SET Adjust RV201 and RV202 to minimize the carrier level at the center portion of the video period within 1 second. * When the minimized carrier level is not obtained, repeat adjustment. 
22.	Low light warning indicator level adjustment	RV323 To set the level of the low light warning display. ● The graphics "LIGHT LOW" are not displayed when the video signal decreases. The graphics "LIGHT OK" are not displayed when the video signal increases.	TP3 Video board	RV324 Deflection board	Shoot the gray scale chart. Display: Check pattern (by pressing the check/normal button) Adjust RV324 so that the video signal is 0.8 Vp-p ± 0.05V.
				RV323 Deflection board	Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW".

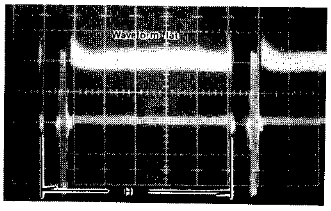
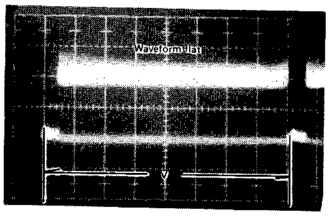
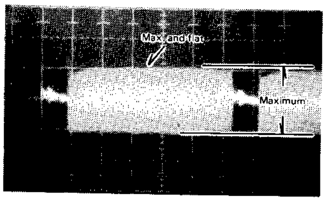
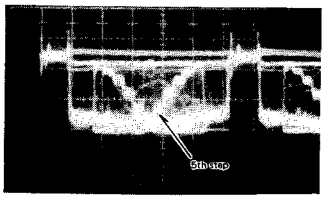
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					

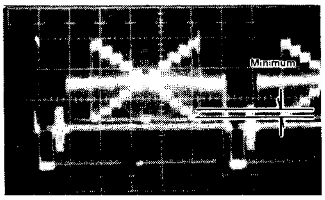
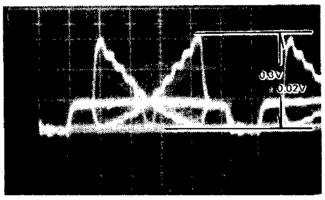
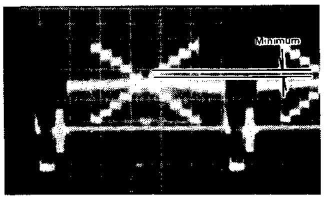
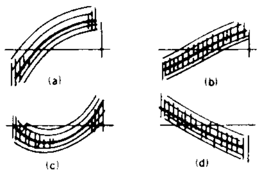
4. Adjustment after replacing preamplifier circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible. 
2.	Smear adjustment	CV501 To correct frequency response of the preamplifier. ● Green or magenta smear occurs on the right side of bright white sections.	TV screen	CV501 Preamplifier board	Perform this adjustment only when color smear occurs. When smear is adjusted, readjust the chroma carrier level, black balance, white balance and degamma. Shoot the gray scale cahrt so that it fills athe TV screen. Adjust color smear using CV501 so that color smear is not present on the right white section of the gray scale of the TV screen.

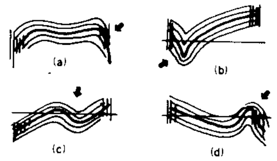
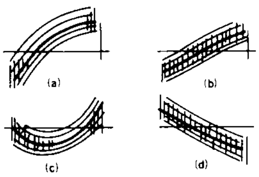
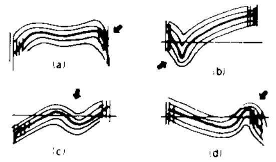
5. Faulty shading adjustment

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Dark shading adjustment	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance unevenness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board	Fit the lens cap. Preadjust RV6 so that the setup level is 0.2 Vp-p.
				PVM2-1, 2-2 Deflection board	Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 
				RVM2-3, 2-4 Deflection board	Set an oscilloscope to the V period. Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
2.	Field focus adjustment	PV301 To adjust the focus electrode voltage of the SATICON so that the electron beam output from the cathode is focused on the photoconductive film. ● Focus is not obtained when the focus ring or the focus adjusting screw of the lens is turned. ● Picture becomes greenish.	TP301 Deflection board TP3-2 ~ TP305 Deflection board	RVM1-1, 1-2, 1-3, 1-4 Deflection board	Short between TP302 and TP303 and between TP304 and TP305. Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
			TP5 Video board	RV301 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Adjust RV301 so the carrier level is max. and flat without peaks and troughs. 
3.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the brightness of the object RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step or higher from the too of the staircase waveform appear. 

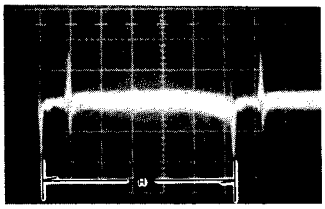
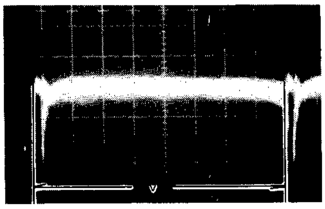
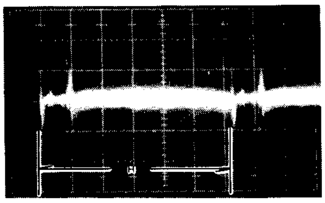
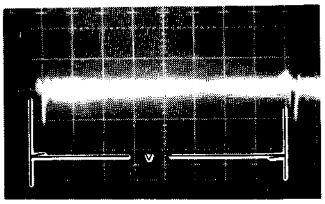
5. Faulty shading adjustment

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		RV23 To adjust setup of the R signal. • The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. • The dark portion of the picture becomes discolored.	TP3 Video board	RV22, 23 Video board	Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase wave. 
			Pin 6 of IC3	RV30 Video board	Adjust RV30 so that the staircase wave level from the pedestal is 0.3 Vp-p ± 0.02V. 
4.	White balance adjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. • White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. • White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
5.	Dynamic focus adjustment	RVM1-1, 1-2, 1-3, 1-4 To correct the periopheral beam focusing of the SATICON. To adjust the amount of dynamic focus. • Color unevenness increases.	TP3-2 ~ TP305 Deflection board TP12 Video board TP14 Video board	RVM1-1, 1-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Short between TP302 and TP303 and between TP304 and TP305. Set the input range of both channels of the oscilloscope to 10 mV/div (probe: 10 : 1) and set to DUAL mode. Adjust the waveform using RVM1-1 and RVM1-2 so that it is easy to correct shading.  Waveform making it easy to correct shading.

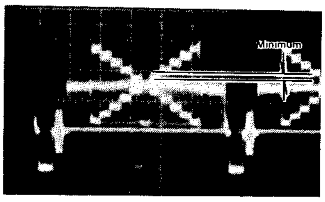
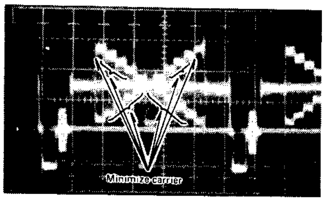
5. Faulty shading adjustment

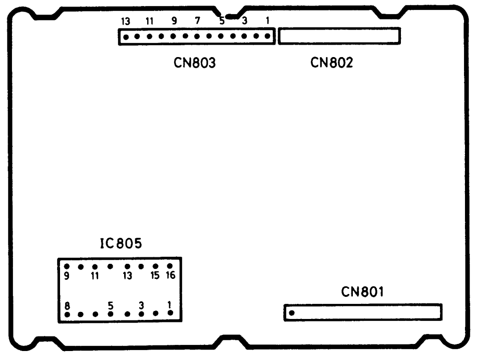
Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 ← : Section with correction not applied Waveform making it difficult to correct shading.
				RVM1-3, 1-4, RV301 Deflection	Set the oscilloscope to the V period. Adjust the waveform using RVM1-3, RVM1-4 and RV301 so that it is easy to correct shading.  Waveform making it easy to correct shading.  ← Section with correction not applied Waveform making it difficult to correct shading. Remove short-circuit.
					* When the waveform easy to correct shading is not obtained by the adjustment shown above, adjust the field focus in item 2, and then perform adjustment shown in item 5 again.
6.	Red/ modulation shading	RVM3-1, 3-2, 3-3, 3-4 To correct R signal color uneveness.	TP12 Video board	RVM3-1, 3-2 Deflection board.	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

5. Faulty shading adjustment

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
				RVM3-3, 3-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM3-3 and RVM3-4 so that the waveform is as flat as possible. 
7.	Blue/ modulation shading adjustment	RVM4-1, 4-2, 4-3, 4-4 To correct B signal color unevenness. • Color uneveness increases.	TP12 Video board	RVM4-1, 4-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM4-1 and RVM4-2 so that the waveform is as flat as possible. 
				RVM4-3, 4-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM4-3 and RVM4-4 so that the waveform is as flat as possible. 
8.	White balance readjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. • White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave.

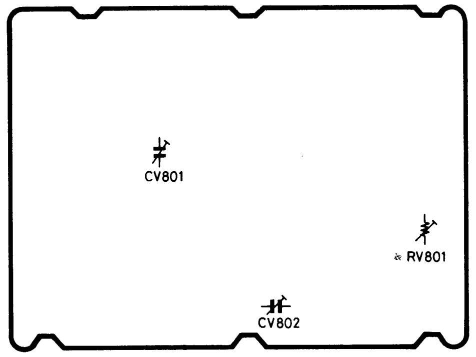
5. Faulty shading adjustment

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		RV17 To match the YL and 8 signal levels and adjust so that white balance is obtained. ● White balance is not obtained.			
9.	De-γ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RV12, 16 Video board RV11, 15 Video board RV10, 14 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave. Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform. Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the too of the staircase waveform. 



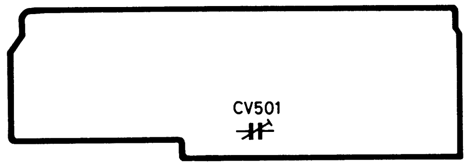
CN803
CN802
IC805
CN801

μCOM-1 P.C Board (pattern side)

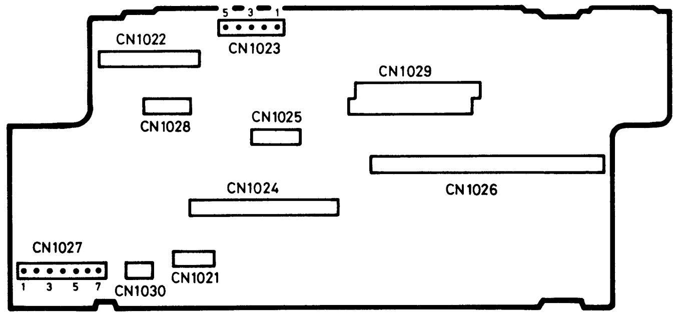


CV801
RV801
CV802

μCOM-1 P.C Board (parts side)

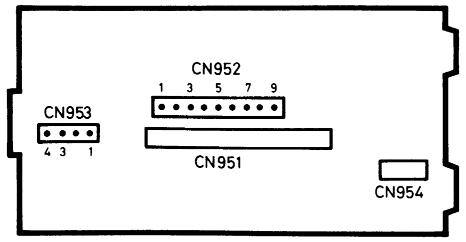


PREAMPLIFIER (PREAMP) P.C Board (parts side)



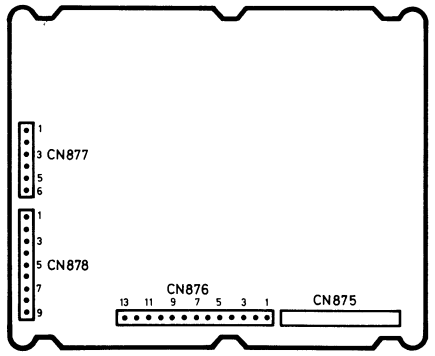
CN1022
CN1023
CN1029
CN1028
CN1025
CN1024
CN1026
CN1027
CN1030
CN1021

MOTHER P.C Board (parts side)



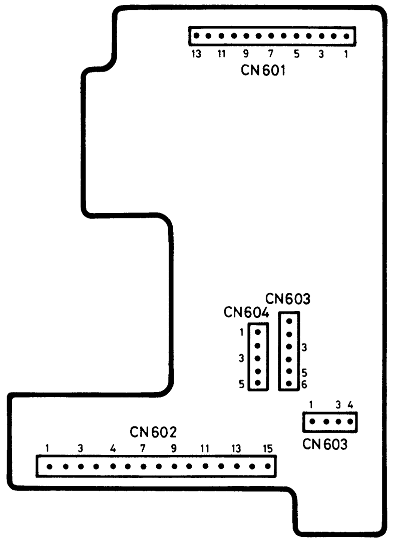
CN952
CN953
CN951
CN954

VTR CONTROL (V CON) P.C Board (parts side)



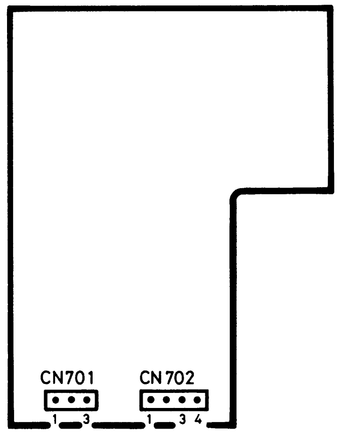
CN877
CN878
CN876
CN875

μCOM-2 P.C Board (pattern side)



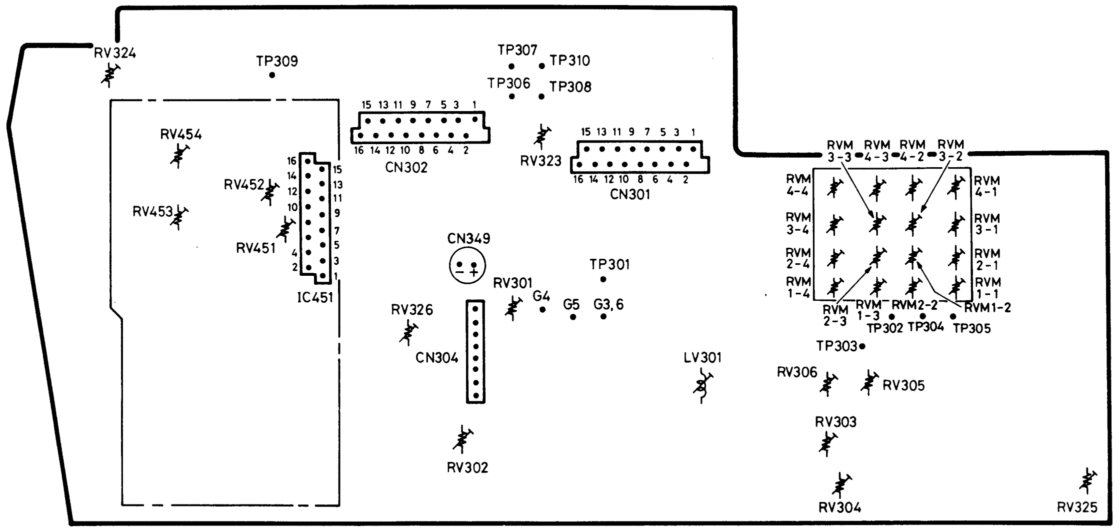
CN601
CN603
CN604
CN602
CN603

VTR INTERFACE (V INT) P.C Board (parts side)



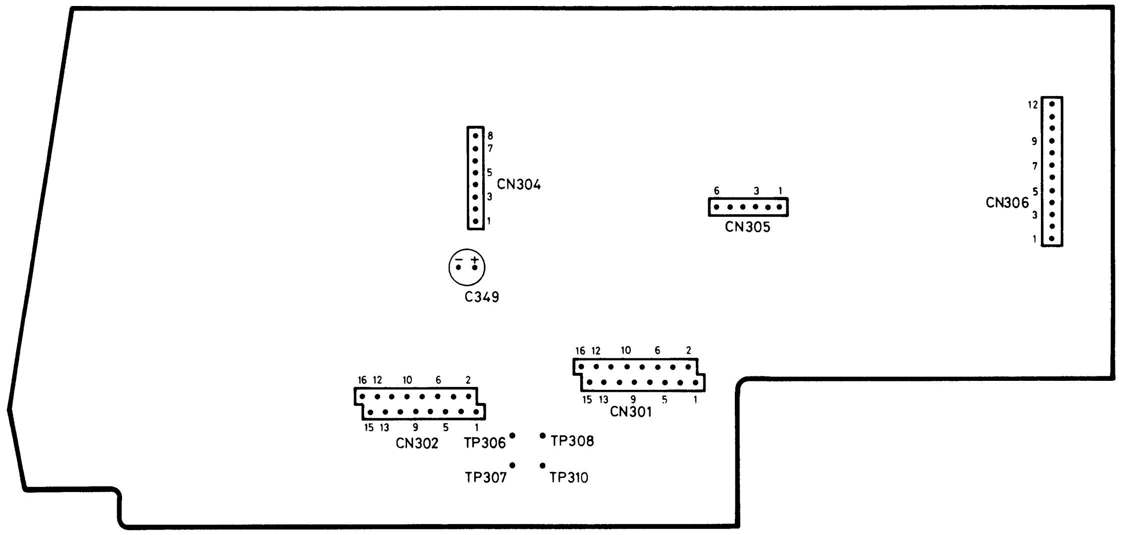
CN701
CN702

AUDIO P.C Board (parts side)



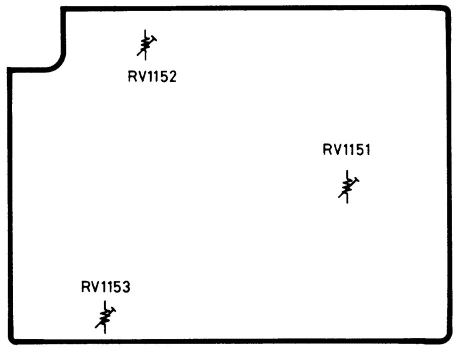
RV324
TP309
TP307
TP310
TP306
TP308
RV454
CN302
RV323
CN301
RV452
RV453
RV451
IC451
CN349
TP301
RV326
RV301
G4
G5
G3, 6
CN304
LV301
RV302
RVM 3-3
RVM 4-3
RVM 4-2
RVM 3-2
RVM 4-4
RVM 4-1
RVM 3-4
RVM 3-1
RVM 2-4
RVM 2-1
RVM 1-4
RVM 1-1
RVM 2-3
RVM 1-3
RVM2-2
RVM1-2
TP302
TP304
TP305
TP303
RV306
RV305
RV303
RV304
RV325

Deflection P.C Board (parts side)



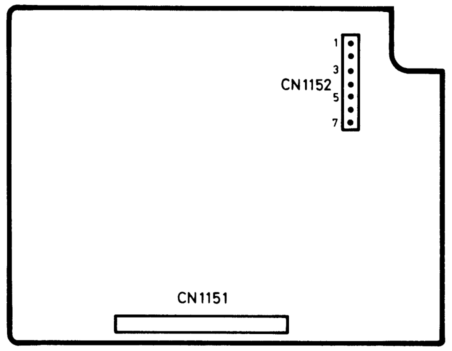
CN304
C349
CN305
CN306
CN302
CN301
TP306
TP308
TP307
TP310

Deflection P.C Board (pattern side)



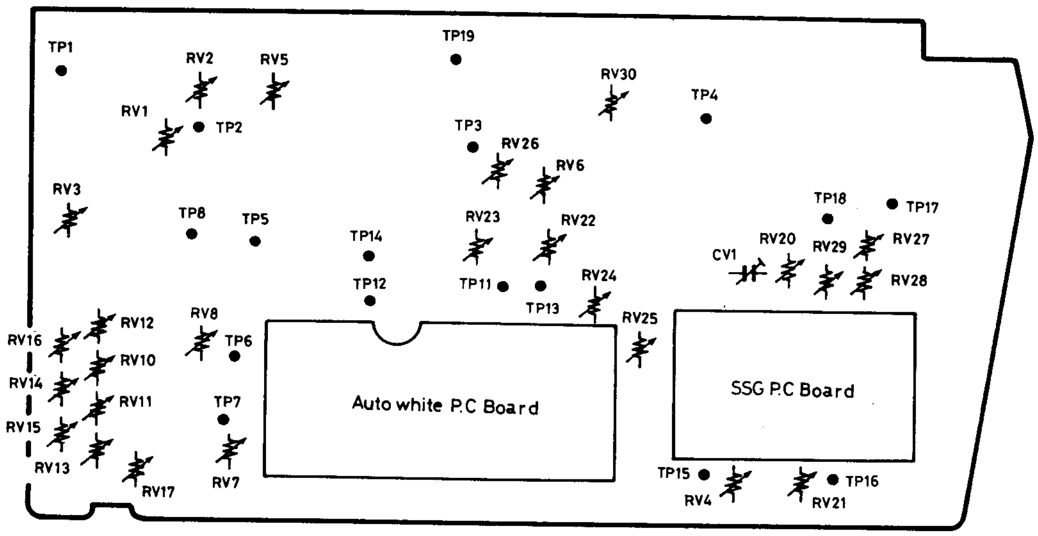
RV1152
RV1151
RV1153

EVF-2 P.C Board (parts side)

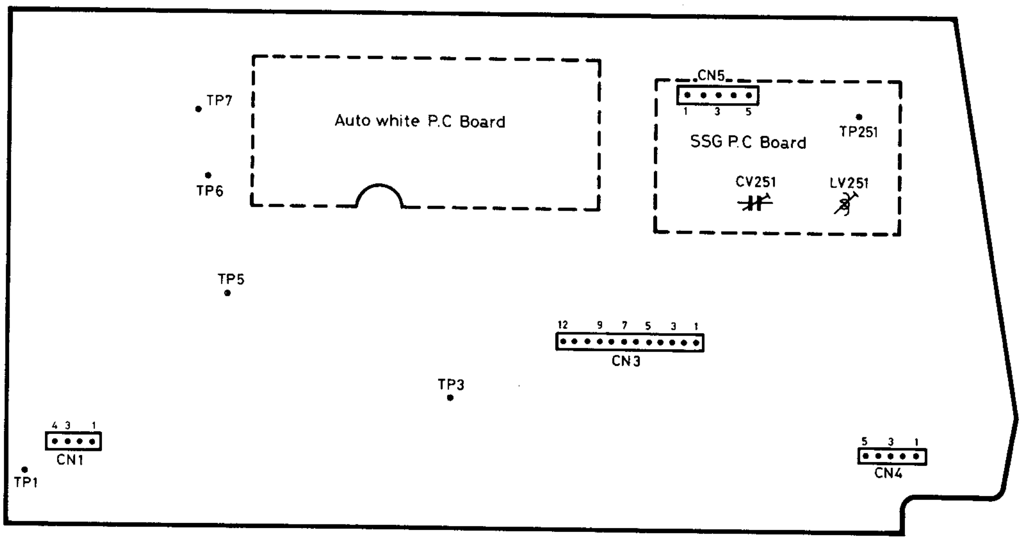


CN1152
CN1151

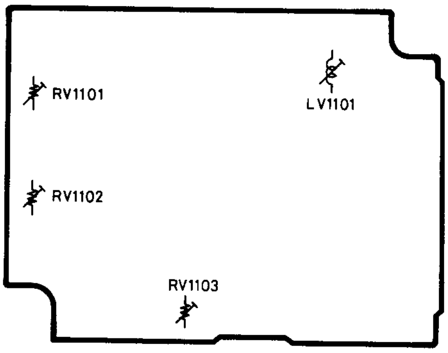
EVF-2 P.C Board (pattern side)


TP1
RV2
RV5
TP19
RV30
TP4
RV1
TP2
TP3
RV26
RV6
RV3
TP8
TP5
TP14
RV23
RV22
TP18
TP17
RV20
RV29
RV27
CV1
RV28
TP12
TP11
TP13
RV24
RV25
RV8
RV12
RV16
TP6
RV10
RV14
RV11
TP7
RV15
RV13
RV17
RV7
Auto white P.C Board
SSG P.C Board
TP15
RV4
TP16
RV21

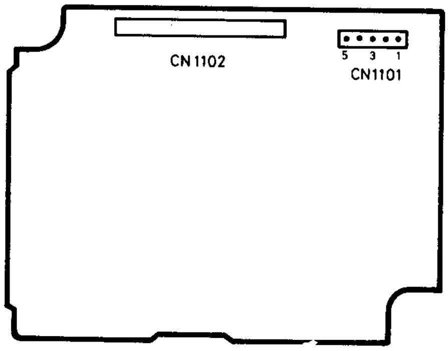
Video P.C Board (parts side)


TP7
Auto white P.C Board
TP6
CN5
1 3 5
SSG P.C Board
TP251
CV251
LV251
TP5
12 9 7 5 3 1
CN3
TP3
4 3 1
CN1
TP1
5 3 1
CN4

Video P.C Board (pattern side)

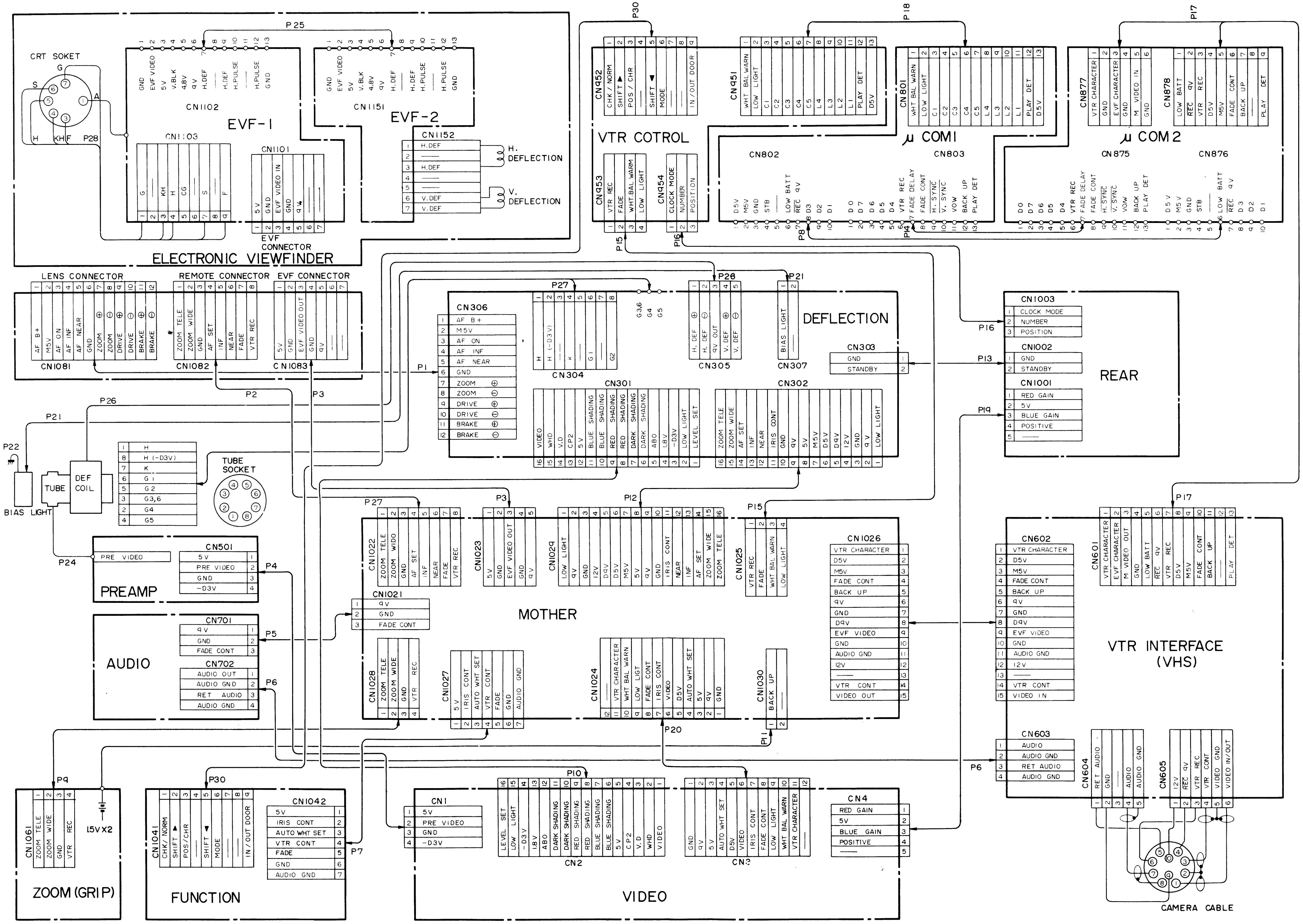

RV1101
LV1101
RV1102
RV1103

EVF-1 P.C Board (parts side)


CN1102
5 3 1
CN1101

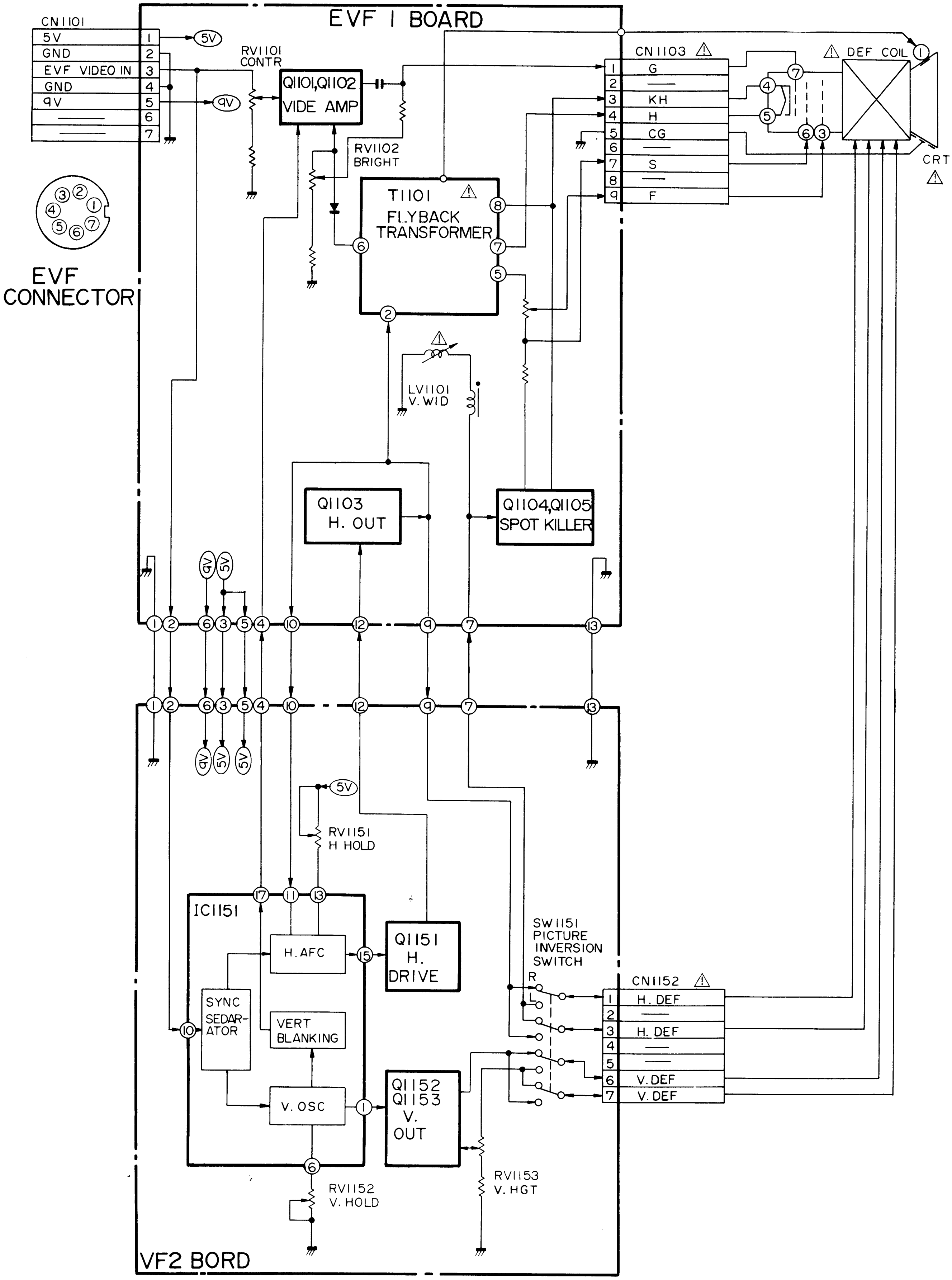
EVF-1 P.C Board (pattern side)

CIRCUIT BOARD CONNECTION DIAGRAM

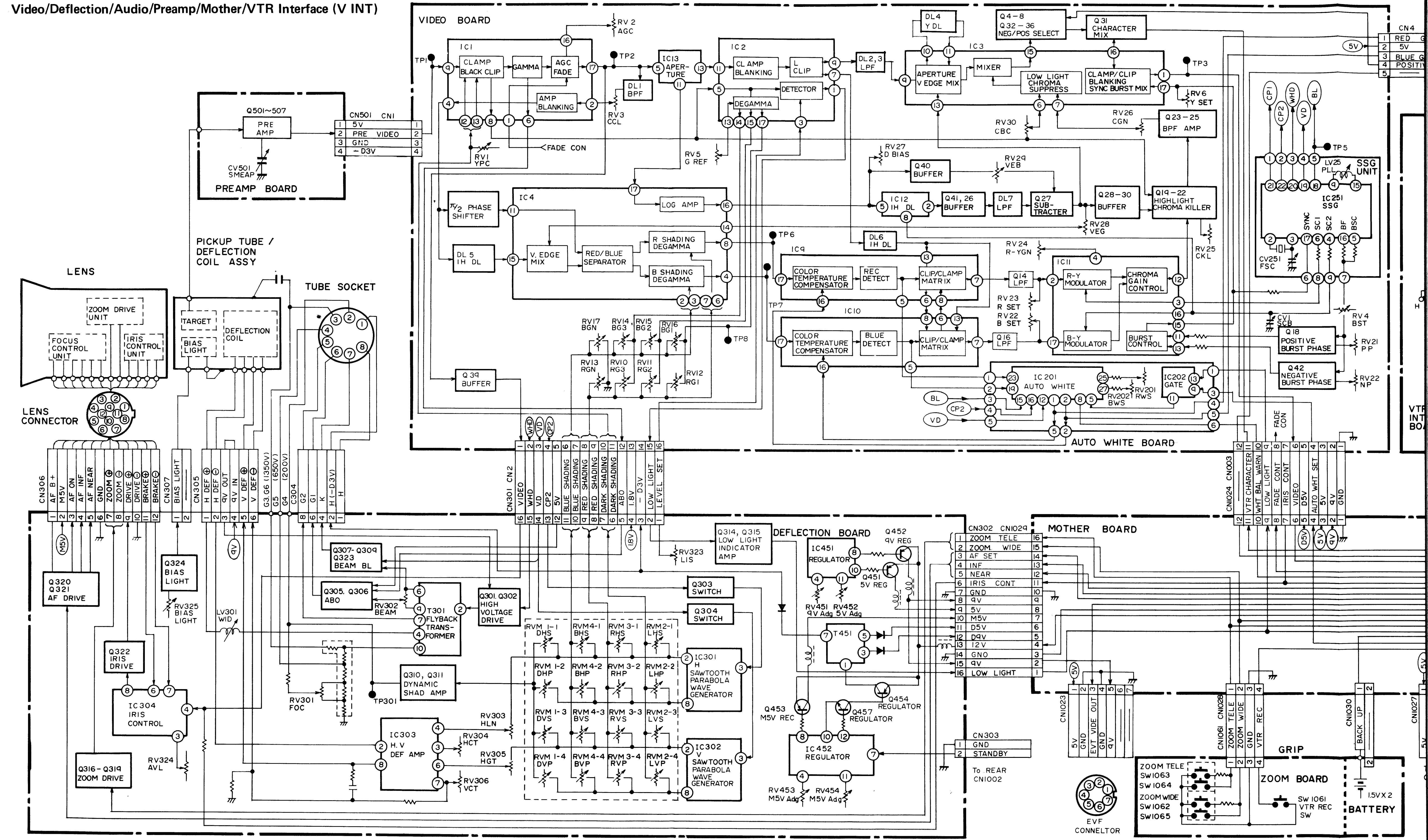

ELECTRONIC VIEWFINDER
CRT SOKET
EVF-1
EVF-2
CN1102
CN1103
CN1101
CN1151
CN1152
H. DEFLECTION
V. DEFLECTION
EVF CONNECTOR
P25
P28
VTR COTROL
CN952
CN951
CN953
CN954
µ COM1
CN801
CN802
CN803
µ COM2
CN877
CN878
CN875
CN876
P30
P18
P17
P15
P16
P8
P14
LENS CONNECTOR
REMOTE CONNECTOR
EVF CONNECTOR
CN1081
CN1082
CN1083
P1
P2
P3
P26
P21
P22
P27
DEFLECTION
CN306
CN304
CN305
CN307
CN303
CN301
CN302
REAR
CN1003
CN1002
CN1001
P13
P19
BIAS LIGHT
TUBE
DEF COIL
TUBE SOCKET
P24
PREAMP
CN501
P4
AUDIO
CN701
CN702
P5
P6
MOTHER
CN1022
CN1023
CN1029
CN1025
CN1026
CN1021
CN1028
CN1027
CN1024
CN1030
P12
P20
P11
VTR INTERFACE (VHS)
CN602
CN601
CN603
CN604
CN605
CAMERA CABLE
ZOOM (GRIP)
CN1061
15V X2
P9
FUNCTION
CN1041
CN1042
P7
VIDEO
CN1
CN2
CN3
CN4
P10

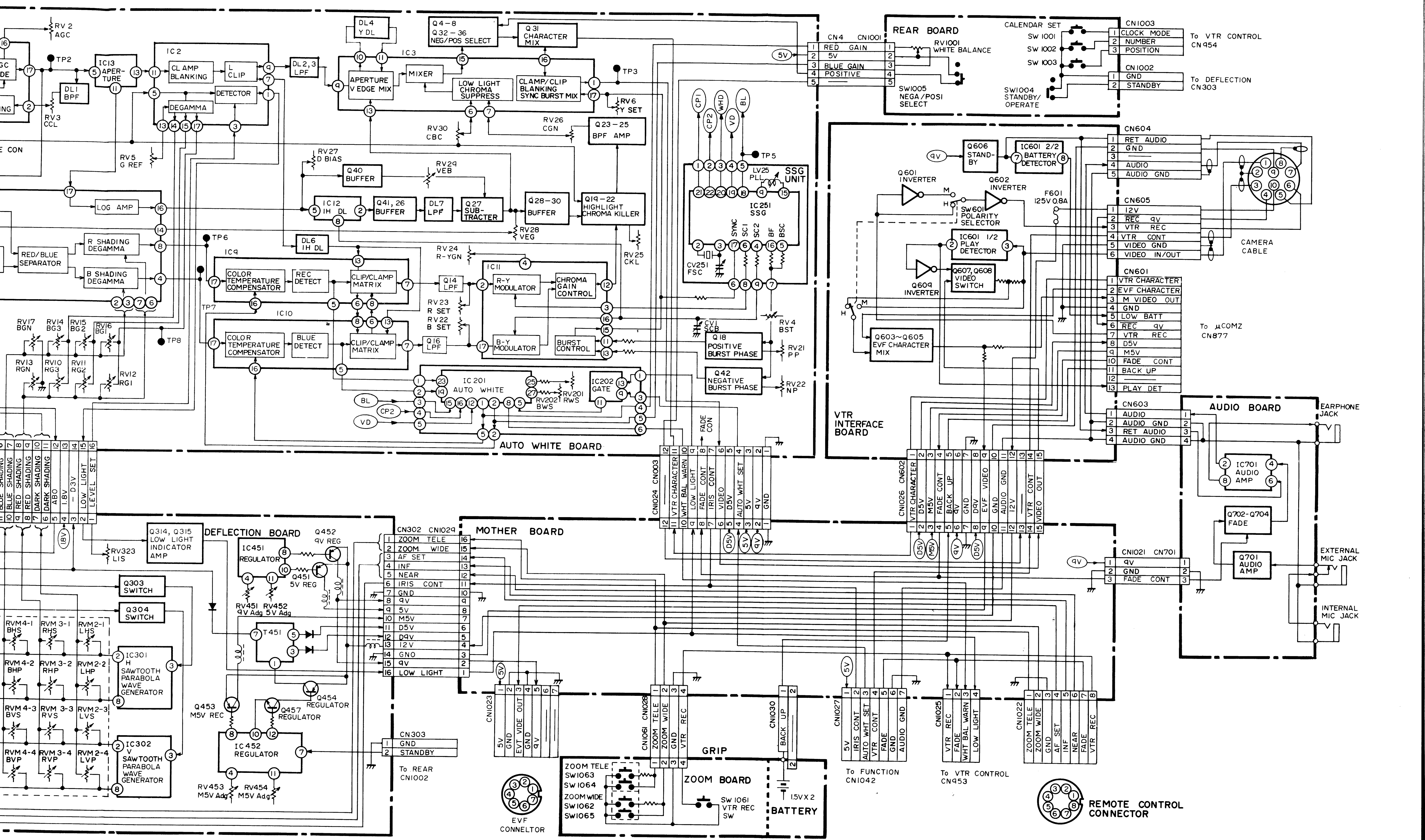
BLOCK DIAGRAM

Electronic Viewfinder

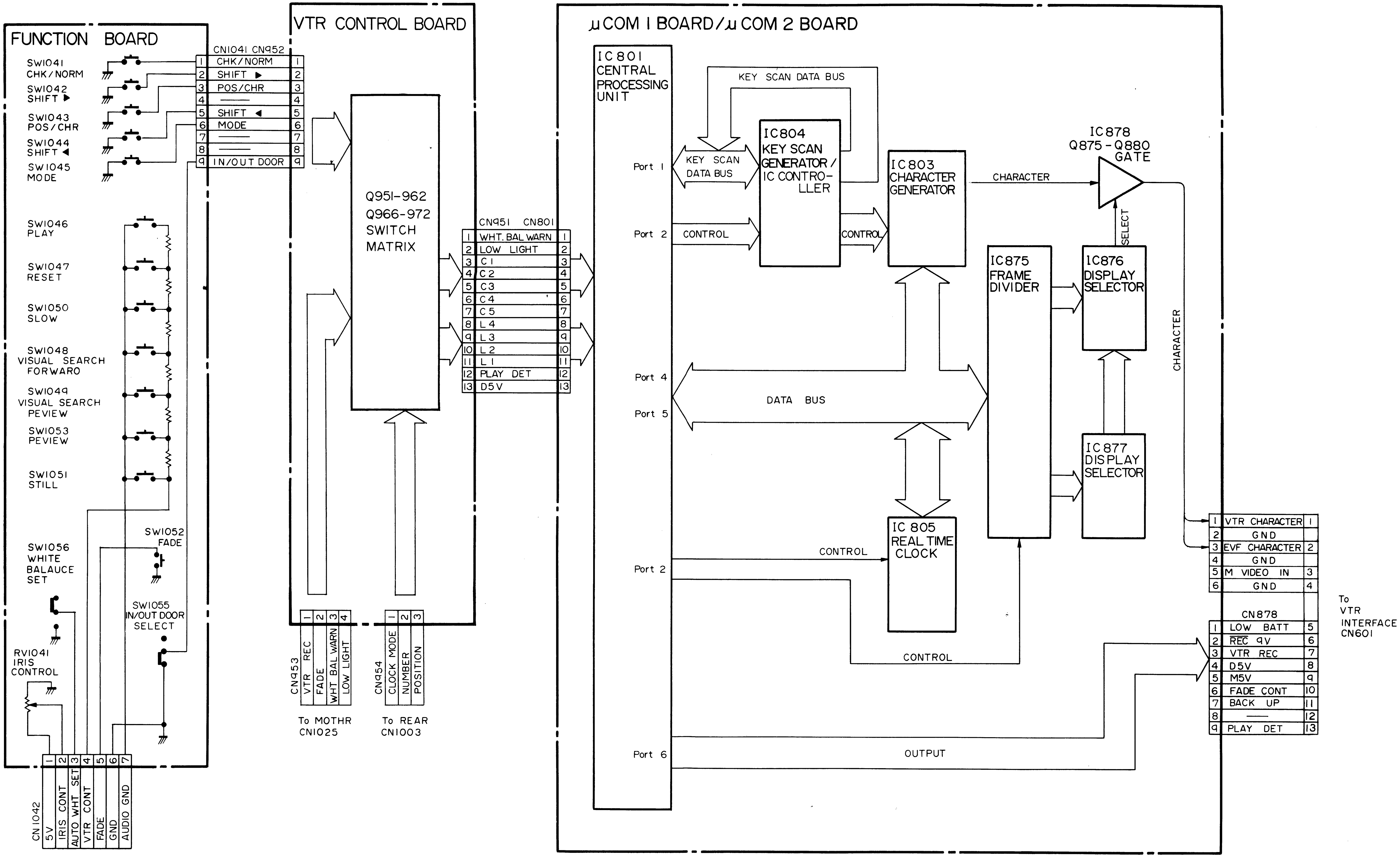

CN1101
5V
GND
EVF VIDEO IN
GND
9V
EVF CONNECTOR
EVF 1 BOARD
RV1101 CONTR
Q1101,Q1102 VIDE AMP
RV1102 BRIGHT
T1101 FLYBACK TRANSFORMER
LV1101 V. WID
Q1103 H. OUT
Q1104,Q1105 SPOT KILLER
CN1103
G
KH
H
CG
S
F
DEF COIL
CRT
VF2 BORD
RV1151 H HOLD
IC1151
SYNC SEDARATOR
H. AFC
VERT BLANKING
V. OSC
Q1151 H. DRIVE
Q1152 Q1153 V. OUT
RV1152 V. HOLD
RV1153 V. HGT
SW1151 PICTURE INVERSION SWITCH
R
L
CN1152
H. DEF
H. DEF
V. DEF
V. DEF
5V
9V

Video/Deflection/Audio/Preamp/Mother/VTR Interface (V INT)


VIDEO BOARD
PREAMP BOARD
Q501~507 PRE AMP
CV501 SMEAP
CN501 CN1
5V
PRE VIDEO
GND
-D3V
IC1 CLAMP BLACK CLIP
GAMMA
AGC FADE
AMP BLANKING
RV2 AGC
RV1 YPC
FADE CON
RV3 CCL
DL1 BPF
IC13 APERTURE
IC2 CLAMP BLANKING
L CLIP
DETECTOR
DEGAMMA
DL2,3 LPF
RV5 G REF
DL4 Y DL
Q4-8 Q32-36 NEG/POS SELECT
Q31 CHARACTER MIX
IC3 APERTURE V EDGE MIX
MIXER
LOW LIGHT CHROMA SUPPRESS
CLAMP/CLIP BLANKING SYNC BURST MIX
RV6 Y SET
RV30 CBC
RV26 CGN
Q23-25 BPF AMP
RV27 D BIAS
Q40 BUFFER
RV29 VEB
IC12 1H DL
Q41,26 BUFFER
DL7 LPF
Q27 SUB-TRACTER
Q28-30 BUFFER
Q19-22 HIGHLIGHT CHROMA KILLER
RV28 VEG
RV25 CKL
π/2 PHASE SHIFTER
IC4
LOG AMP
DL5 1H DL
V. EDGE MIX
RED/BLUE SEPARATOR
R SHADING DEGAMMA
B SHADING DEGAMMA
DL6 1H DL
IC9 COLOR TEMPERATURE COMPENSATOR
REC DETECT
CLIP/CLAMP MATRIX
IC10 COLOR TEMPERATURE COMPENSATOR
BLUE DETECT
CLIP/CLAMP MATRIX
Q14 LPF
Q16 LPF
RV24 R-YGN
RV23 R SET
RV22 B SET
IC11 R-Y MODULATOR
CHROMA GAIN CONTROL
B-Y MODULATOR
BURST CONTROL
CV1 SCB
Q18 POSITIVE BURST PHASE
RV21 PP
Q42 NEGATIVE BURST PHASE
RV22 NP
RV4 BST
SSG UNIT
IC251 SSG
LV25 PLL
CV251 FSC
SYNC SC1 SC2 BF BSC
CP1 CP2 WHD VD BL
CN4
RED
5V
BLUE
POSITI
TP1 TP2 TP3 TP5 TP6 TP7 TP8
RV17 BGN
RV14 BG3
RV15 BG2
RV16 BG1
RV13 RGN
RV10 RG3
RV11 RG2
RV12 RG1
Q39 BUFFER
IC201 AUTO WHITE
IC202 GATE
RV201 RWS
RV202 BWS
AUTO WHITE BOARD
LENS
ZOOM DRIVE UNIT
FOCUS CONTROL UNIT
IRIS CONTROL UNIT
LENS CONNECTOR
PICKUP TUBE / DEFLECTION COIL ASSY
TARGET
DEFLECTION COIL
BIAS LIGHT
TUBE SOCKET
CN306 AF B+ M5V AF ON AF INF AF NEAR GND ZOOM⊕ ZOOM⊖ DRIVE⊕ DRIVE⊖ BRAKE⊕ BRAKE⊖
CN307 BIAS LIGHT
CN305 H DEF⊕ H DEF⊖ 9V OUT 9V IN V DEF⊕ V DEF⊖
G3.G6 (1350V)
G5 (650V)
G4 (200V)
C304
G2 G1 K H(-D3V) H
CN301 CN2 VIDEO WHD VD CP2 5V BLUE SHADING BLUE SHADING RED SHADING RED SHADING DARK SHADING DARK SHADING ABO 1.8V -D3V LOW LIGHT LEVEL SET
CN1024 CN003 VTR CHARACTER WHT BAL WARN LOW LIGHT FADE CONT IRIS CONT VIDEO D5V AUTO WHT SET 5V 9V GND
DEFLECTION BOARD
Q320 Q321 AF DRIVE
Q324 BIAS LIGHT
RV325 BIAS LIGHT
Q307-Q309 Q323 BEAM BL
Q305, Q306 ABO
RV302 BEAM
T301 FLYBACK TRANS-FORMER
Q301, Q302 HIGH VOLTAGE DRIVE
Q314, Q315 LOW LIGHT INDICATOR AMP
RV323 LIS
Q303 SWITCH
Q304 SWITCH
LV301 WID
Q322 IRIS DRIVE
IC304 IRIS CONTROL
RV324 AVL
Q316-Q319 ZOOM DRIVE
RV301 FOC
Q310, Q311 DYNAMIC SHAD AMP
TP301
IC303 H.V DEF AMP
RV303 HLN
RV304 HCT
RV305 HGT
RV306 VCT
RVM1-1 DHS
RVM4-1 BHS
RVM3-1 RHS
RVM2-1 LHS
RVM1-2 DHP
RVM4-2 BHP
RVM3-2 RHP
RVM2-2 LHP
RVM1-3 DVS
RVM4-3 BVS
RVM3-3 RVS
RVM2-3 LVS
RVM1-4 DVP
RVM4-4 BVP
RVM3-4 RVP
RVM2-4 LVP
IC301 H SAWTOOTH PARABOLA WAVE GENERATOR
IC302 V SAWTOOTH PARABOLA WAVE GENERATOR
IC451 REGULATOR
Q452 9V REG
Q451 5V REG
RV451 9V Adg
RV452 5V Adg
T451
Q453 M5V REC
Q457 REGULATOR
Q454 REGULATOR
IC452 REGULATOR
RV453 M5V Adg
RV454 M5V Adg
CN303 GND STANDBY
To REAR CN1002
CN302 CN1029
ZOOM TELE
ZOOM WIDE
AF SET
INF
NEAR
IRIS CONT
GND
9V
5V
M5V
D5V
D9V
12V
GNO
9V
LOW LIGHT
MOTHER BOARD
CN1023 5V GND EVF VIDE OUT GND 9V
EVF CONNELTOR
CN1061 CN1028 ZOOM TELE ZOOM WIDE GND VTR REC
GRIP
ZOOM BOARD
ZOOM TELE SW1063 SW1064
ZOOM WIDE SW1062 SW1065
SW1061 VTR REC SW
CN1030 BACK UP
BATTERY
1.5V×2
VTR INT BO


RV 2 AGC
TP2
IC13 APERTURE
DL1 BPF
RV3 CCL
IC2
CLAMP BLANKING
L CLIP
DETECTOR
DEGAMMA
DL2,3 LPF
DL4 Y DL
Q4-8 Q32-36 NEG/POS SELECT
Q31 CHARACTER MIX
IC3
APERTURE V EDGE MIX
MIXER
LOW LIGHT CHROMA SUPPRESS
CLAMP/CLIP BLANKING SYNC BURST MIX
TP3
RV6 Y SET
RV30 CBC
RV26 CGN
Q23-25 BPF AMP
RV5 G REF
RV27 D BIAS
Q40 BUFFER
RV29 VEB
LOG AMP
IC12 1H DL
Q41, 26 BUFFER
DL7 LPF
Q27 SUBTRACTER
Q28-30 BUFFER
Q19-22 HIGHLIGHT CHROMA KILLER
RV28 VEG
RV25 CKL
R SHADING DEGAMMA
B SHADING DEGAMMA
RED/BLUE SEPARATOR
TP6
DL6 1H DL
IC9
COLOR TEMPERATURE COMPENSATOR
REC DETECT
CLIP/CLAMP MATRIX
Q14 LPF
RV24 R-YGN
IC11
R-Y MODULATOR
CHROMA GAIN CONTROL
IC10
BLUE DETECT
Q16 LPF
B-Y MODULATOR
BURST CONTROL
RV23 R SET
RV22 B SET
TP7
TP8
RV17 BGN
RV14 BG3
RV15 BG2
RV16 BG1
RV13 RGN
RV10 RG3
RV11 RG2
RV12 RG1
IC 201 AUTO WHITE
RV201 RWS
RV202 BWS
IC202 GATE
BL
CP2
VD
AUTO WHITE BOARD
CP1
WHD
TP5
LV25 PLL
SSG UNIT
IC251 SSG
SYNC SC1 SC2 BF BSC
CV251 FSC
CV1 SCB
Q18 POSITIVE BURST PHASE
Q42 NEGATIVE BURST PHASE
RV4 BST
RV21 PP
RV22 NP
CN4 CN1001
RED GAIN
5V
BLUE GAIN
POSITIVE
REAR BOARD
RV1001 WHITE BALANCE
SW1005 NEGA/POSI SELECT
CALENDAR SET
SW 1001
SW 1002
SW 1003
SW1004 STANDBY/OPERATE
CN1003
CLOCK MODE
NUMBER
POSITION
To VTR CONTROL CN954
CN1002
GND
STANDBY
To DEFLECTION CN303
CN604
RET AUDIO
GND
AUDIO
AUDIO GND
Q606 STAND-BY
IC601 2/2 BATTERY DETECTOR
9V
Q601 INVERTER
Q602 INVERTER
SW601 POLARITY SELECTOR
F601 125V 0.8A
CN605
12V
REC 9V
VTR REC
VTR CONT
VIDEO GND
VIDEO IN/OUT
CAMERA CABLE
IC601 1/2 PLAY DETECTOR
Q607, Q608 VIDEO SWITCH
Q609 INVERTER
Q603~Q605 EVF CHARACTER MIX
CN601
VTR CHARACTER
EVF CHARACTER
M VIDEO OUT
GND
LOW BATT
REC 9V
VTR REC
D5V
M5V
FADE CONT
BACK UP
PLAY DET
To μCOMZ CN877
VTR INTERFACE BOARD
CN603
AUDIO
AUDIO GND
RET AUDIO
AUDIO GND
AUDIO BOARD
EARPHONE JACK
IC701 AUDIO AMP
Q702-Q704 FADE
Q701 AUDIO AMP
EXTERNAL MIC JACK
INTERNAL MIC JACK
CN1021 CN701
9V
GND
FADE CONT
CN1024 CN003
VTR CHARACTER
WHT BAL WARN
LOW LIGHT
FADE CONT
IRIS CONT
VIDEO
D5V
AUTO WHT SET
5V
9V
GND
FADE CON
CN1026 CN602
VTR CHARACTER
D5V
M5V
FADE CONT
BACK UP
9V
D9V
EVF VIDEO
GND
AUDIO GND
12V
VTR CONT
VIDEO OUT
BLUE SHADING
RED SHADING
DARK SHADING
ABO
1.8V
- D3V
LOW LIGHT
LEVEL SET
18V
DEFLECTION BOARD
Q314, Q315 LOW LIGHT INDICATOR AMP
RV323 LIS
IC451 REGULATOR
Q452 9V REG
Q451 5V REG
RV451 9V Adg
RV452 5V Adg
Q303 SWITCH
Q304 SWITCH
T451
RVM4-1 BHS
RVM3-1 RHS
RVM2-1 LHS
RVM4-2 BHP
RVM3-2 RHP
RVM2-2 LHP
RVM4-3 BVS
RVM3-3 RVS
RVM2-3 LVS
RVM4-4 BVP
RVM3-4 RVP
RVM2-4 LVP
IC301 H SAWTOOTH PARABOLA WAVE GENERATOR
IC302 V SAWTOOTH PARABOLA WAVE GENERATOR
Q453 M5V REC
Q457 REGULATOR
Q454 REGULATOR
IC452 REGULATOR
RV453 M5V Adg
RV454 M5V Adg
CN303
GND
STANDBY
To REAR CN1002
CN302 CN1029
ZOOM TELE
ZOOM WIDE
AF SET
INF
NEAR
IRIS CONT
GND
9V
5V
M5V
D5V
D9V
12V
GND
9V
LOW LIGHT
MOTHER BOARD
CN1023
5V
GND
EVT VIDE OUT
GND
9V
EVF CONNELTOR
CN1061 CN1028
ZOOM TELE
ZOOM WIDE
GND
VTR REC
GRIP
ZOOM BOARD
ZOOM TELE SW1063 SW1064
ZOOM WIDE SW1062 SW1065
SW 1061 VTR REC SW
CN1030
BACK UP
1.5V X 2
BATTERY
CN1027
5V
IRIS CONT
AUTO WHT SET
VTR CONT
FADE
GND
AUDIO GND
To FUNCTION CN1042
CN1025
VTR REC
FADE
WHT BAL WARN
LOW LIGHT
To VTR CONTROL CN953
CN1022
ZOOM TELE
ZOOM WIDE
GND
AF SET
INF
NEAR
FADE
VTR REC
REMOTE CONTROL CONNECTOR

μCOM-1, -2/VTR Control (V CON)/Function

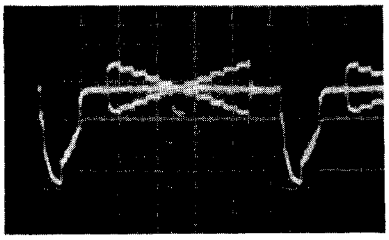

FUNCTION BOARD
SW1041 CHK/NORM
SW1042 SHIFT ▶
SW1043 POS/CHR
SW1044 SHIFT ◀
SW1045 MODE
SW1046 PLAY
SW1047 RESET
SW1050 SLOW
SW1048 VISUAL SEARCH FORWARO
SW1049 VISUAL SEARCH PEVIEW
SW1053 PEVIEW
SW1051 STILL
SW1052 FADE
SW1056 WHITE BALAUCE SET
SW1055 IN/OUT DOOR SELECT
RV1041 IRIS CONTROL
CN1041 CN952
1 CHK/NORM 1
2 SHIFT ▶ 2
3 POS/CHR 3
4 —— 4
5 SHIFT ◀ 5
6 MODE 6
7 —— 7
8 —— 8
9 IN/OUT DOOR 9
CN1042
1 5V
2 IRIS CONT
3 AUTO WHT SET
4 VTR CONT
5 FADE
6 GND
7 AUDIO GND
VTR CONTROL BOARD
Q951-962
Q966-972
SWITCH MATRIX
CN953
1 VTR REC
2 FADE
3 WHT BAL WARN
4 LOW LIGHT
To MOTHR CN1025
CN954
1 CLOCK MODE
2 NUMBER
3 POSITION
To REAR CN1003
CN951 CN801
1 WHT. BAL WARN 1
2 LOW LIGHT 2
3 C1 3
4 C2 4
5 C3 5
6 C4 6
7 C5 7
8 L4 8
9 L3 9
10 L2 10
11 L1 11
12 PLAY DET 12
13 D5V 13
μCOM 1 BOARD/μCOM 2 BOARD
IC801 CENTRAL PROCESSING UNIT
Port 1
Port 2
Port 4
Port 5
Port 2
Port 6
KEY SCAN DATA BUS
KEY SCAN DATA BUS
CONTROL
IC804 KEY SCAN GENERATOR/IC CONTRO-LLER
CONTROL
IC803 CHARACTER GENERATOR
CHARACTER
IC878 Q875-Q880 GATE
SELECT
IC875 FRAME DIVIDER
IC876 DISPLAY SELECTOR
IC877 DISPLAY SELECTOR
CHARACTER
DATA BUS
CONTROL
IC 805 REAL TIME CLOCK
CONTROL
OUTPUT
1 VTR CHARACTER 1
2 GND
3 EVF CHARACTER 2
4 GND
5 M VIDEO IN 3
6 GND 4
CN878
1 LOW BATT 5
2 REC 9V 6
3 VTR REC 7
4 D5V 8
5 M5V 9
6 FADE CONT 10
7 BACK UP 11
8 —— 12
9 PLAY DET 13
To VTR INTERFACE CN601

WAVEFORMS

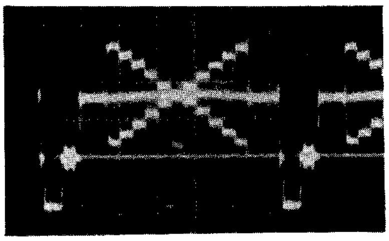
Electronic Viewfinder

EVF-1

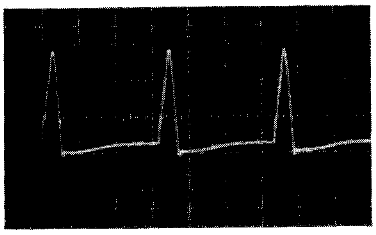
CN1103-1
5V/10 μsec • div



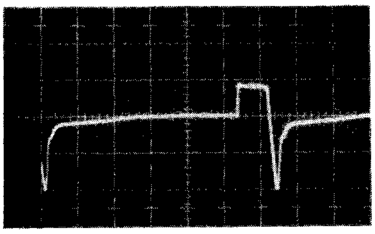
CN1103-3
0.2V/10 μsec • div



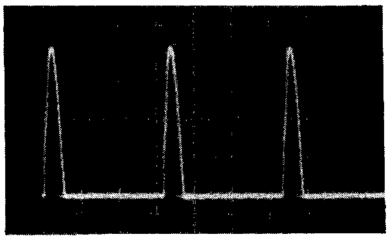
CN1103-7
10V/20 μsec • div



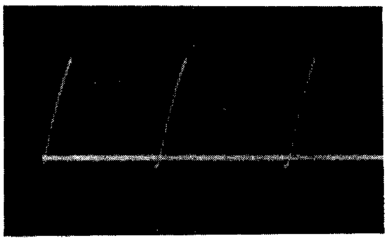
Q1102-BASE
1V/10 μsec • div



Q1103-COLLECTOR
20V/20 μsec • div

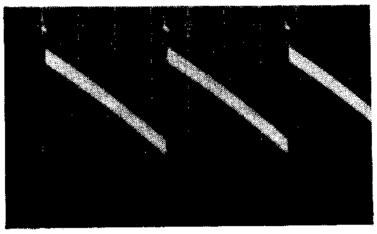


Q1105-COLLECTOR
5V/20 μsec • div

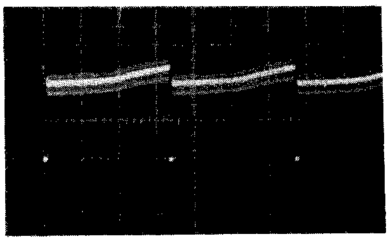


EVF-2

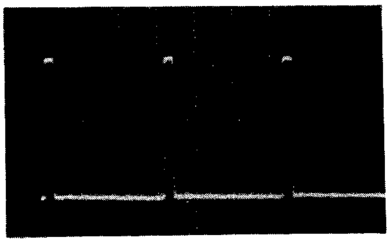
Q1152-EMITTER
2V/5msec • div



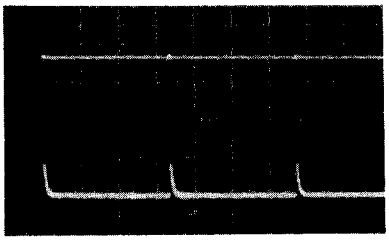
IC1151-1
0.5V/5msec • div



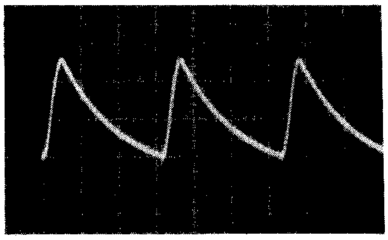
IC1151-8
1V/20 μsec • div



IC1151-8
1V/5msec • div

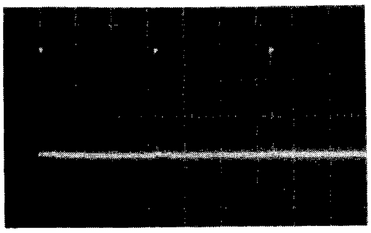


IC1151-11
0.5V/20 μsec • div

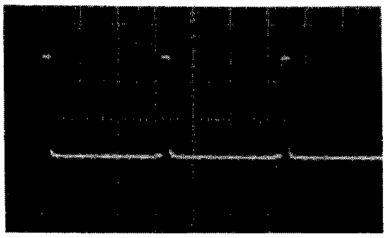


Video

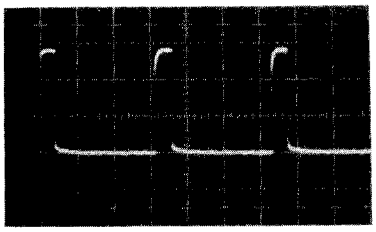
CN5-1
2V/20 μsec • div



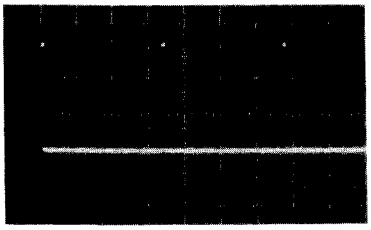
CN5-1
2V/20 μsec • div



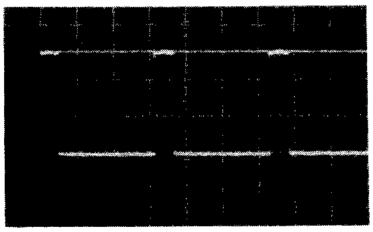
CN5-3
2V/20 μsec • div



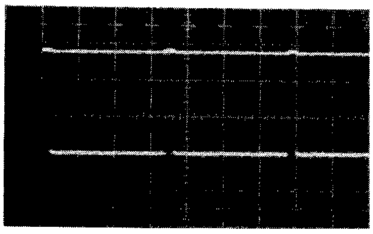
CN5-4
2V/5msec • div



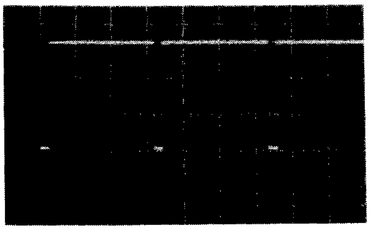
CN5-5
2V/20 μsec • div



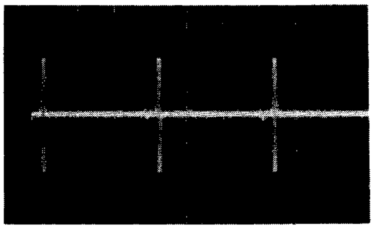
CN5-5
2V/5msec • div



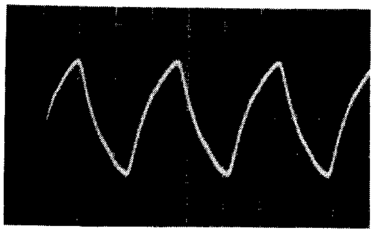
CN6-1
2V/20 μsec • div



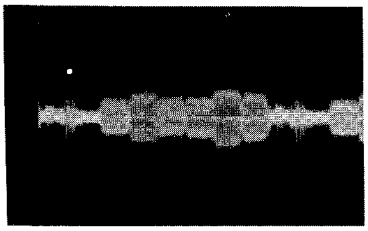
CN6-2
0.5V/20 μsec • div



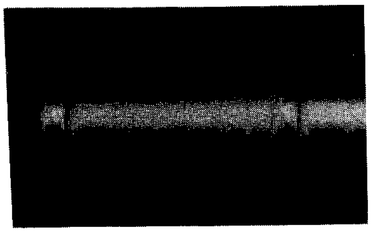
CN6-3
0.2V/0.1 μsec • div



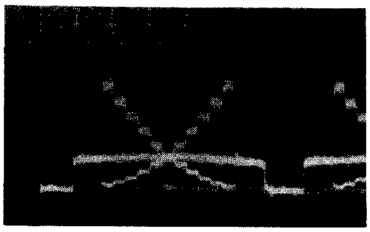
Q23 BASE
50mV/10 μsec • div



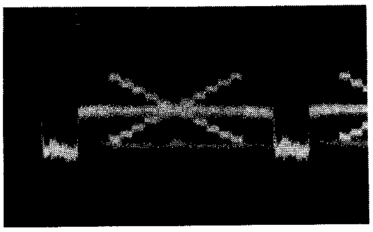
Q30 COLLECTOR
50mV/10 μsec • div



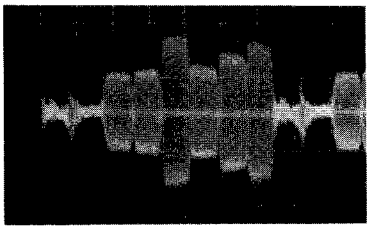
IC1-8
0.2V/10 μsec • div



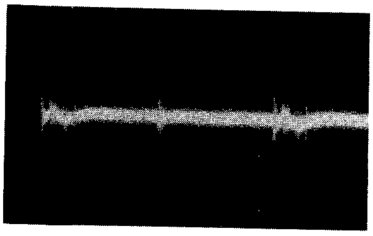
IC3-9
50mV/10 μsec • div



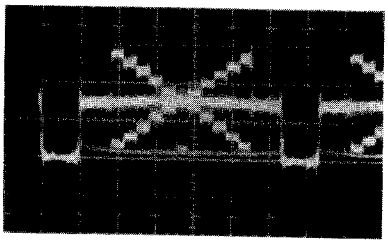
IC3-7
50mV/10 μsec • div



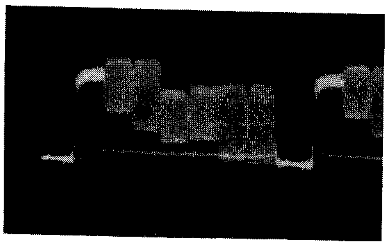
IC3-13
50mV/10 μsec • div



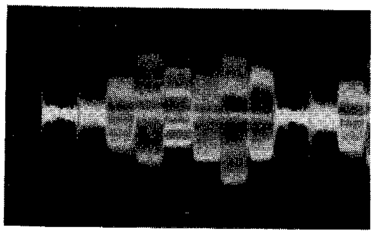
IC3-15
0.5V/10 μsec • div



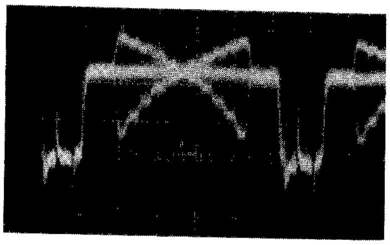
IC3-15
0.5V/10 μsec • div



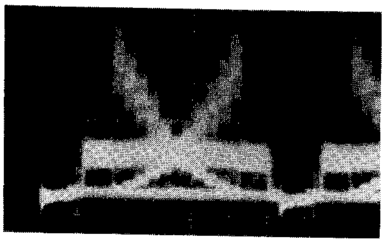
IC11-12
0.1V/10 μsec • div



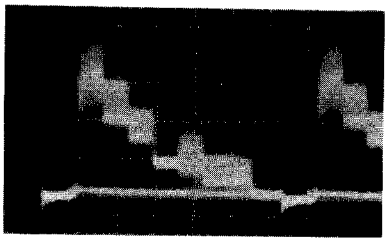
IC12-5
50mV/10 μsec • div



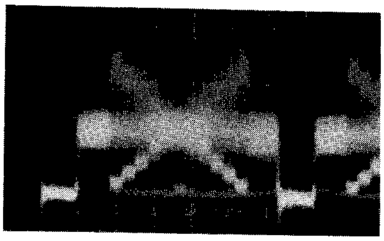
TP1
0.2V/10 μsec



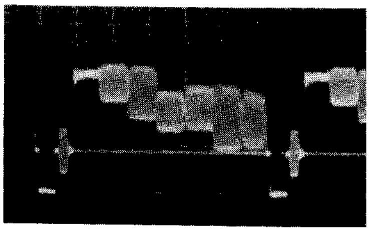
TP1
0.2V/10 μsec • div



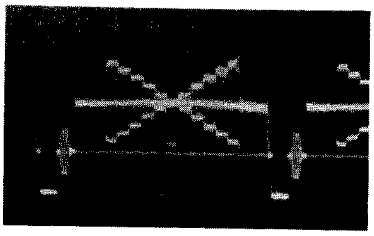
TP2
0.1V/10 μsec • div



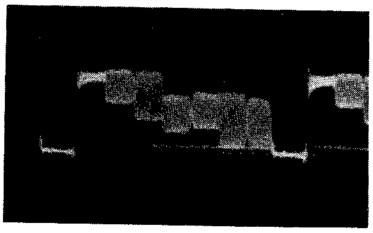
TP3
0.5V/10 μsec • div



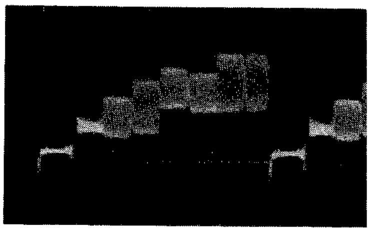
TP3
0.5V/10 μsec • div



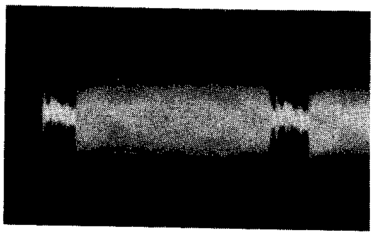
TP4 (POS)
0.5V/10 μsec • div



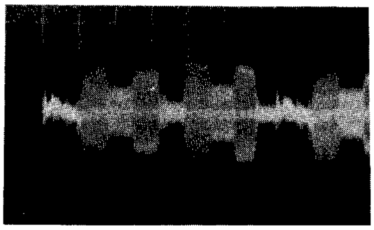
TP4 (NEG.)
0.5V/10 μsec • div



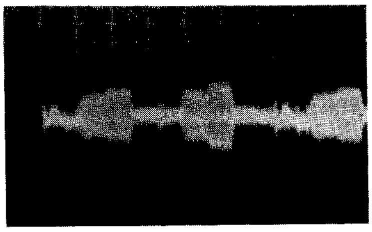
TP5
50mV/10 μsec • div



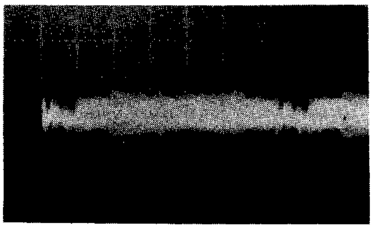
TP5
50mV/10 μsec • div



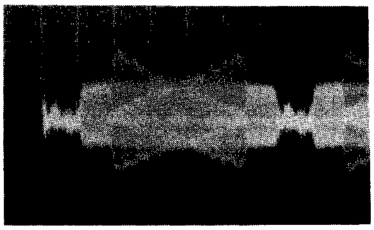
TP6
50mV/10 μsec • div



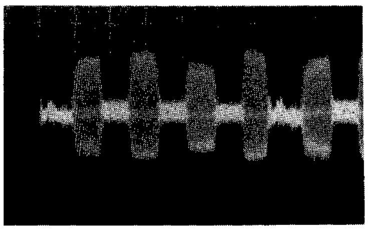
TP6
50mV/10 μsec • div



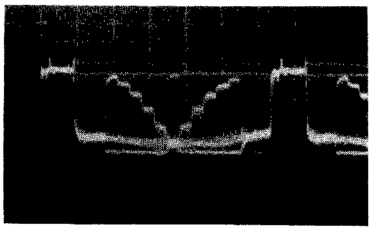
TP7
50mV/10 μsec • div



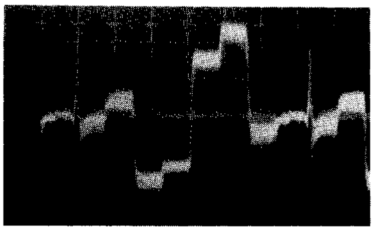
TP7
50mV/10 μsec • div



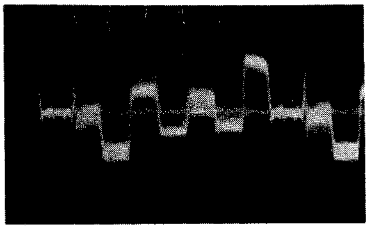
TP8
0.2V/10 μsec • div



TP12
0.1V/10 μsec • div

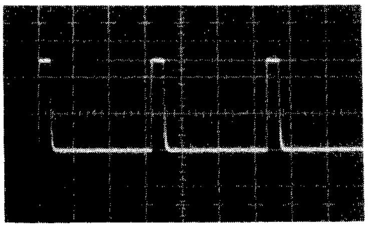


TP14
0.1V/10 μsec • div

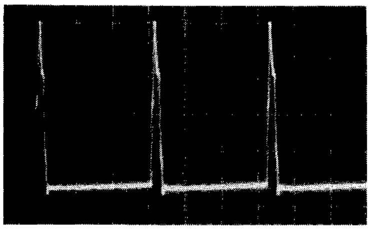


Deflection

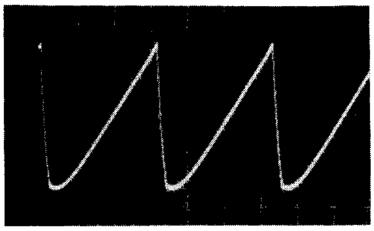
CN304-4
20V/20 μsec • div



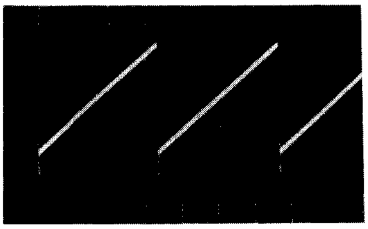
CN305-1
10V/20 μsec • div



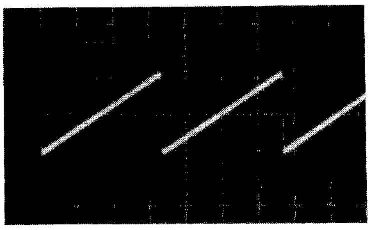
CN305-2
0.5V/20 μsec • div



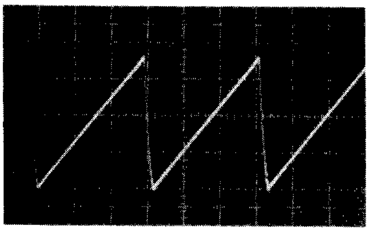
CN305-5
1V/5msec • div



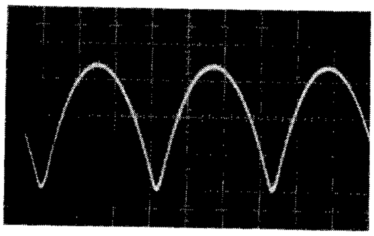
CN305-6
0.2V/5msec • div



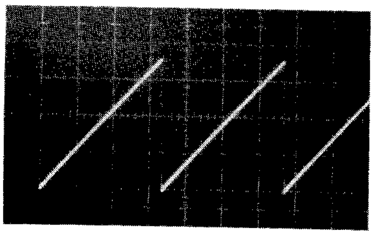
IC301-2
0.5V/20 μsec • div



IC301-8
0.5V/20 μsec • div



IC302-2
0.5V/5msec • div



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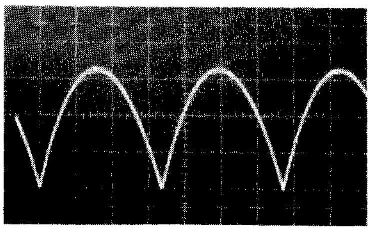
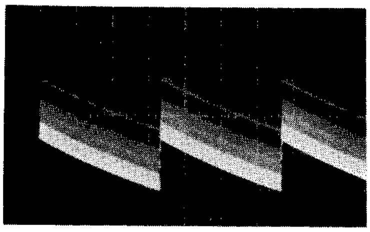
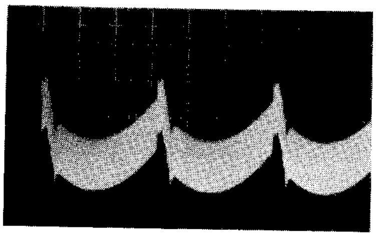


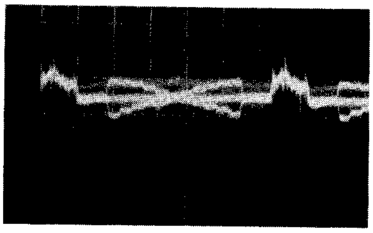
TP301
2V/5msec • div



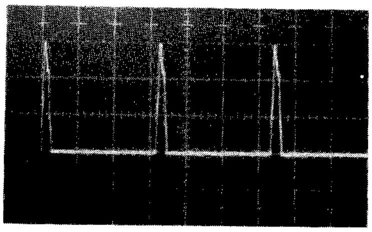
TP301
2V/20 μsec • div



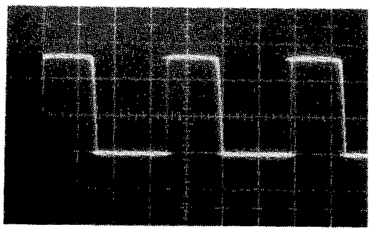
TP302
50mV/20 μsec • div



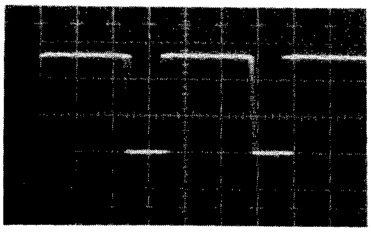
T301-2
50V/20 μsec • div



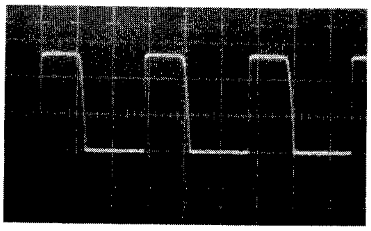
Q451 COLLECTOR
5V/5 μsec • div



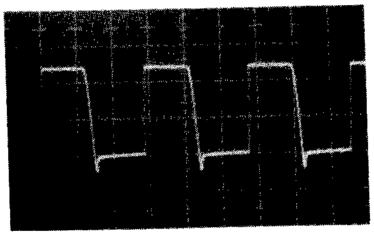
Q452 COLLECTOR
5V/5 μsec • div



Q453 COLLECTOR
5V/5 μsec • div

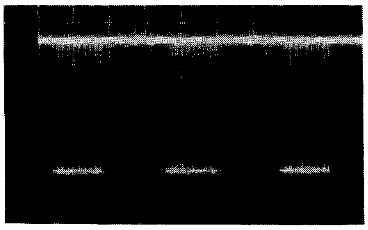


Q454 COLLECTOR
10V/5 μsec • div

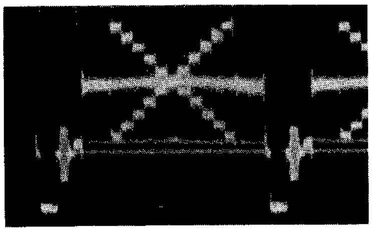


VTR Interface (V INT)

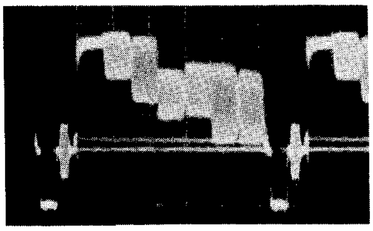
CN602-1
0.2V/20 μsec • div



CN605-6
0.2V/10 μsec • div

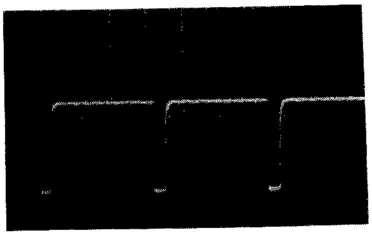


CN605-6
0.2V/10 μsec • div

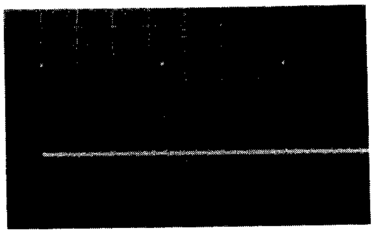


μCOM-1

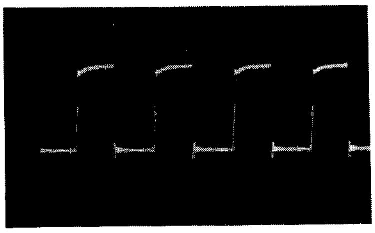
Q881 COLLECTOR
2V/20 μsec • div



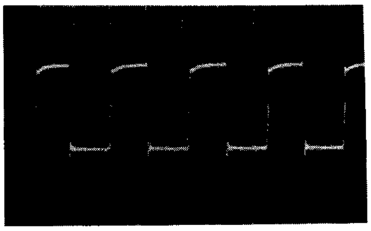
Q883 COLLECTOR
2V/5msec • div



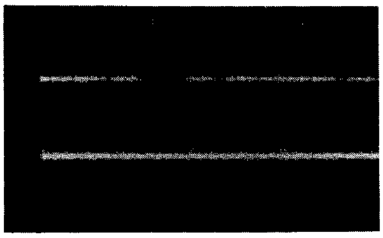
IC802-7 (POWER SAVE)
2V/2 μsec • div



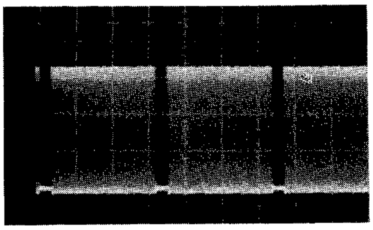
IC802-7 (NORM)
2V/2 μsec • div



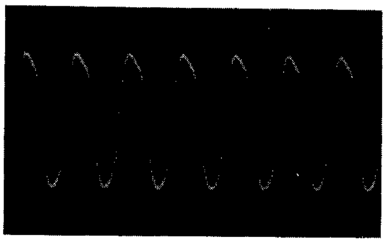
IC803-5
2V/10 μsec • div



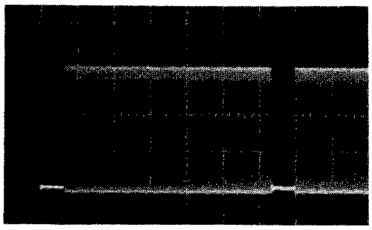
IC803-10
1V/20 μsec • div



IC803-10
1V/0.5 μsec • div



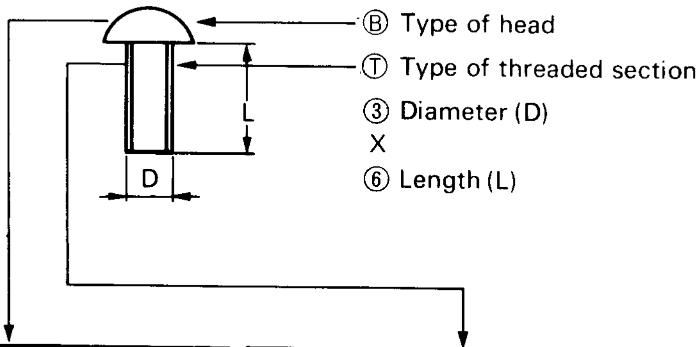
IC803-10
1V/10 μsec • div

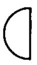
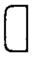
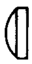
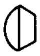
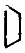


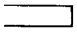
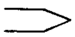
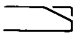
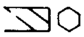
EXPLODED VIEWS

SCREW CLASSIFICATION

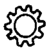
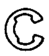
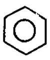
Example: BT3 × 6



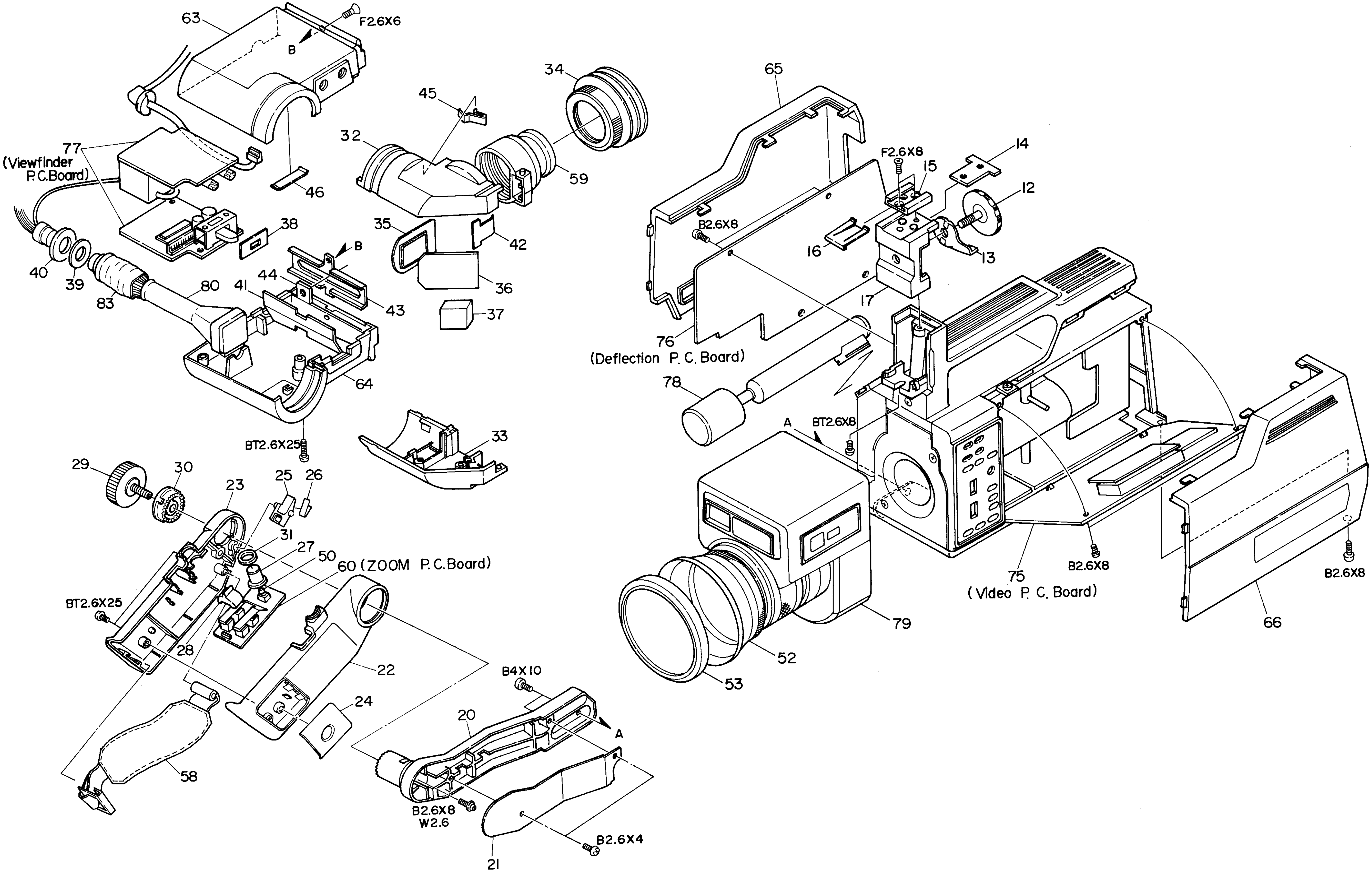
Abbre-viation	Name	Shape
No symbol	Brazier head	
P	Pan head	
B	Binding head	
O	Oval countersunk head	
F	Flat countersunk head	

Abbre-viation	Name	Shape
No symbol	Machine (clamps without tapping)	
t	Tapping (clamps with tapping) Type 1	
T	Tapping (clamps with tapping) Type 2	
f	Forming tight (for metal)	
Note	Since the forming tight screw tightens while self-tapping, machine screws can be replaced by tapping screws.	

Washers and Nuts

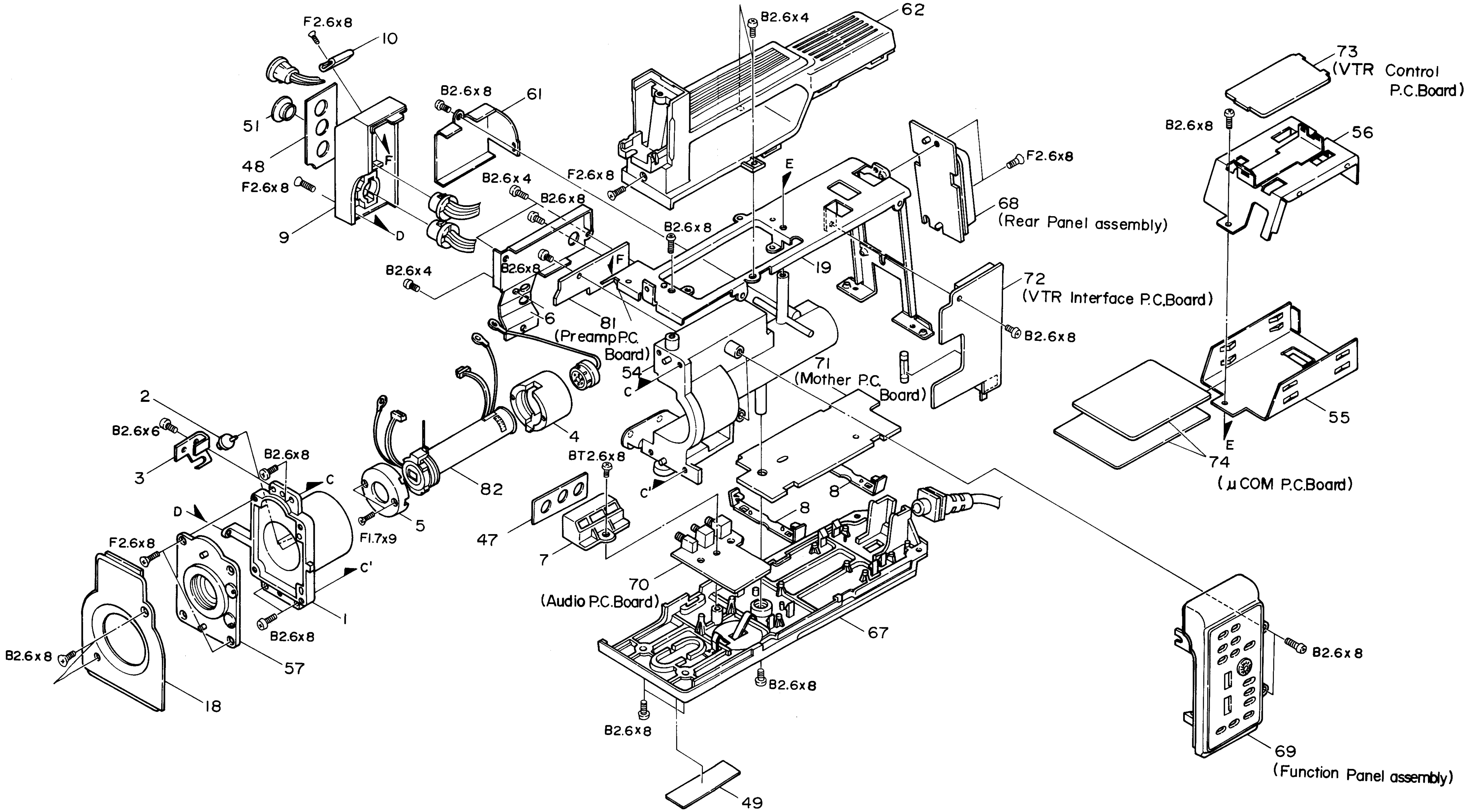
Abbre-viation	Name	Shape
W LW LW	Washer Spring washer Locking washer	 
E	E-ring	
N	Nut	
Note	Internal dia is indicated for nuts and washers.	

Case · Electronic Viewfinder

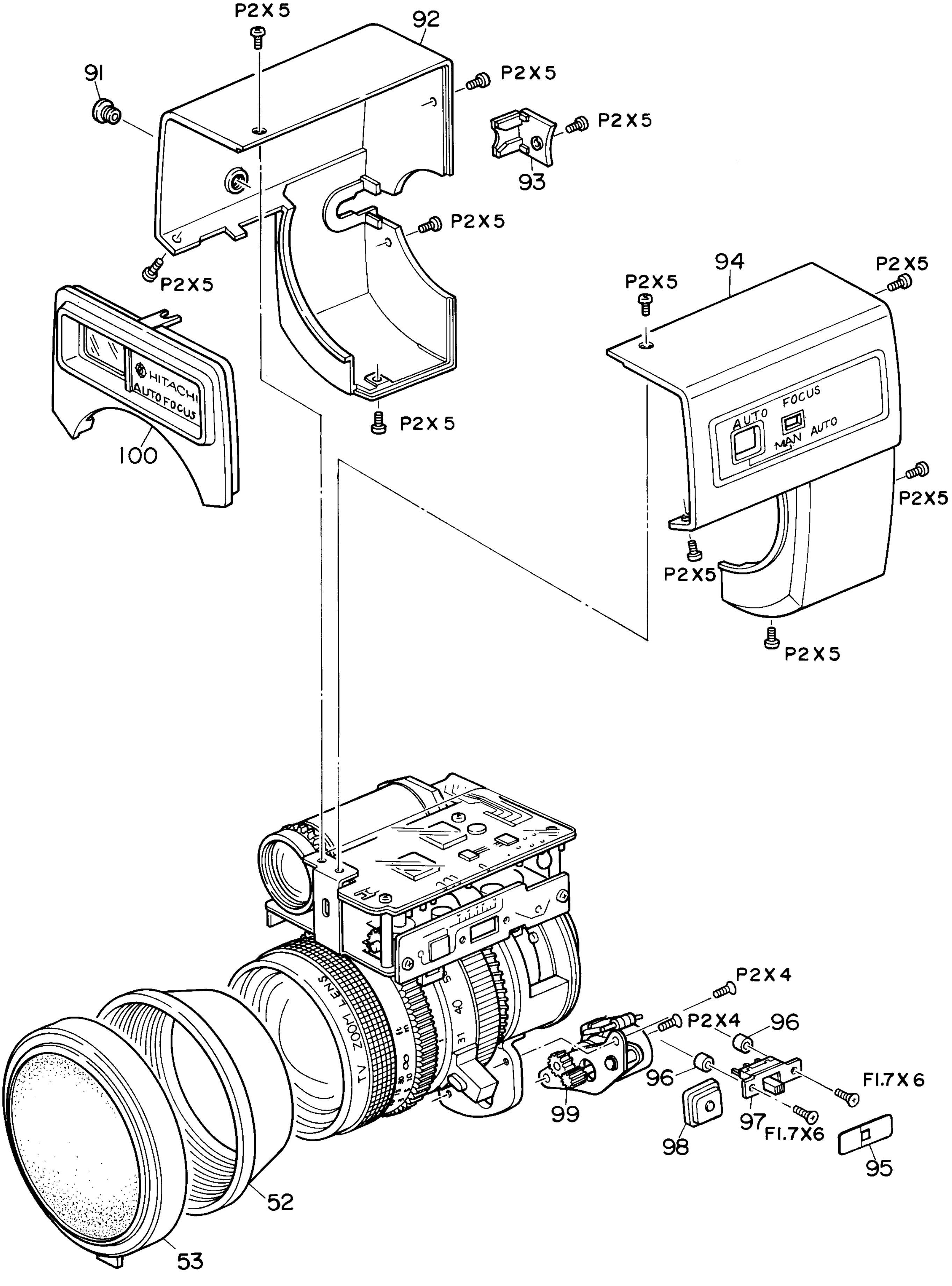


63
F2.6X6
B
34
65
45
32
77
(Viewfinder
P.C.Board)
46
59
F2.6X8
14
15
12
B2.6X8
38
35
42
16
13
B
40
39
83
80
41
44
43
36
37
17
76
(Deflection P. C. Board)
64
78
A
BT2.6X8
BT2.6X25
33
29
30
23
25
26
31
27
50
60 (ZOOM P.C.Board)
BT2.6X25
28
22
24
B4X10
20
A
58
B2.6X8
W2.6
21
B2.6X4
53
52
79
75
(Video P. C. Board)
B2.6X8
B2.6X8
66

Chassis


F2.6x8
10
51
48
F2.6x8
9
D
F
B2.6x8
61
B2.6x4
B2.6x8
B2.6x4
B2.6x8
F
6
81
(Preamp P.C. Board)
B2.6x4
62
F2.6x8
B2.6x8
E
19
F2.6x8
68
(Rear Panel assembly)
72
(VTR Interface P.C.Board)
B2.6x8
73
(VTR Control P.C.Board)
B2.6x8
56
55
E
74
(μ COM P.C.Board)
54
C
C'
71
(Mother P.C. Board)
2
B2.6x6
3
B2.6x8
C
D
F2.6x8
C'
1
B2.6x8
B2.6x8
57
18
4
82
5
F1.7x9
BT2.6x8
47
7
70
(Audio P.C.Board)
8
8
67
B2.6x8
B2.6x8
49
69
(Function Panel assembly)
B2.6x8

Lens



P2X5
92
91
P2X5
P2X5
93
P2X5
P2X5
94
P2X5
P2X5
HITACHI
AUTO FOCUS
100
P2X5
AUTO
FOCUS
MAN
AUTO
P2X5
P2X5
P2X5
TV ZOOM LENS
P2X4
P2X4
96
96
F1.7X6
99
97
F1.7X6
98
95
52
53

REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
1	6798951	HOLDER
2	4500301	PIN
3	6878221	PIN HOLDER
4	6978941	HOLDER (B)
5	6978961	HOLDER (A)
7	6022321	COVER
8	6337651	HINGE
9	6878351	PANEL
10	6878231	MICROPHONE SHOE
11	6175021	COVER
12	6075381	KNOB-EVF
13	7386181	LOCK LEVER
14	7785251	NUT
15	7386151	SHOE
16	6537371	SPRING
17	6878381	HOLDER
18	6023211	FRONT COVER
20	6978931	GRIP BASE
21	6644451	BASE COVER
22	6878321	GRIP (A)
23	6878261	GRIP (B)
27	6067461	BUTTON
28	6878251	ZOOM LEVER
29	6075411	KNOB
30	6978921	HOLDER
31	7678661	CUSHION
32	6878361	NECK COVER
33	6878371	NECK COVER
34	6591601	EYE CAP
35	6644441	PLATE
36	6955321	MIRROR
37	7678651	CUSHION
38	6878331	SWITCH COVER
39	7789081	WASHER
40	7789091	WASHER
41	7684781	SHIELD COVER
42	6537341	SPRING
43	7386161	BRACKET
44	7386171	PLATE
45	6537351	SPRING
46	6537361	SPRING
47	6688551	PLATE
48	6688561	PLATE

SYMBOL-NO	P-NO	DESCRIPTION
49	4643182	RATING LABEL (E)
50	7746741	CUSHION
51	6878341	CAP
52	6878271	LENS HOOD
53	6878241	LENS CAP
57	6644401	LENS MOUNT
58	6335171	STRAP
59	6878111	LENS HOLDER
60	5961041	CIRCUIT "ZOOM"
62	6878121	HOLDER
62	6872122	HOLDER
62	6872123	HOLDER
63	6022221	TOP COVER-EVF
64	6022241	BOTTOM COVER-EVF
65	6022231	COVER (R)
66	6022261	COVER (L)
67	6022251	BOTTOM COVER
68	6208852	REAR PANEL (E)
69	6208861	PANEL
70	5961001	CIRCUIT "AUDIO"
71	5961071	CIRCUIT "MOTHER"
72	5938252	CIRCUIT "VTR INTERFASE" (E)
73	5961081	CIRCUIT "VTR CONTROL"
74	5961052	CIRCUIT "U CON" (E)
75	5961022	CIRCUIT "VIDEO" (E)
76	5961012	CIRCUIT "DEFLECTION" (E)
77	5961032	CIRCUIT "VIEWFINDER" (E)
78	5422011	MICROPHONE
81	5961061	CIRCUIT "PRE AMP"

HITACHI SERVICE MANUAL

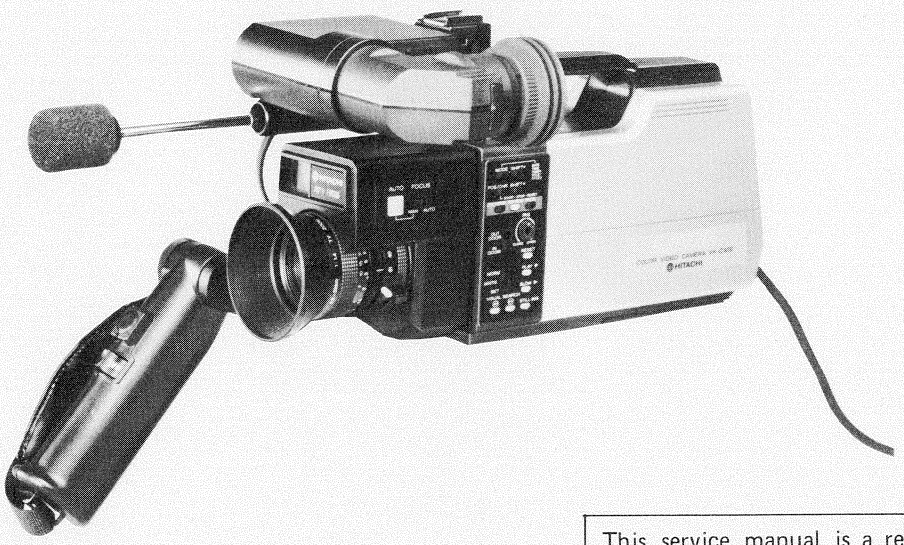
TK

No. 2061E

VK-C870E

REVISED

Technical Data



This service manual is a revised edition of the previously issued manual No. 1980E; the schematic and circuit board diagrams are added. Please use this manual when servicing the VK-C870E.

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with ⚠ in the block diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

Dec. 1983 TOKAI WORKS

CONTENTS

SPECIFICATIONS 1
KEY TO ILLUSTRATIONS 2
DISASSEMBLY 3
Names of circuit boards 3
Camera Disassembly 4
1. Removing Cases 4
2. Removing Circuit Boards 5
3. Removing Electronic Viewfinder 8
4. Removing Camera Tube (SATICON)/ Deflection Coil Assembly 9
5. Removing Lens 11
TROUBLESHOOTING 13
1. No picture 13
2. Colour reproduction poor 15
  2-1 Greenish 15
  2-2 Picture greenish 15
  2-3 Picture reddish 16
  2-4 Picture bluish 16
  2-5 No colour Coloured too much 16
  2-6 Highlight section greenish 16
  2-7 Colour unevenness too much 17
3. White balance correction not possible 17
  3-1 Tint does not change with position of Indoor/Outdoor switch changed? 17
  3-2 Auto white set does not operate 17
  3-3 White balance drifts when auto white is set. . . 17
  3-4 Tint does not change with white balance control turned 18
4. Picture missing in horizontal direction 18
5. Picture missing in vertical direction 18
6. Abnormal black spot is seen in picture 18
7. Sync distortion 19
8. Picture smearing 19
9. Power zoom does not operate 19
10. Trigger button of camera does not operate normally with VTR set to record mode 20
11. Rmote control does not operate properly when combined with remote control VTR 20
12. No picture in electronic viewfinder 21
13. Electronic viewfinder sync distortion 21
14. Picture in electronic viewfinder becomes a single lateral line 22
15. Vertical size of picture in electronic viewfinder shrinks 22
16. Audio monitoring is not possible via earphone jack on camera 23
17. No sound 23
18. Character display defective 24
  18-1 No character signal in video output 24
  18-2 Clock function does not work 24
ADJUSTMENT 25
The table of contents for adjustment is described in details on page 25.
CIRCUIT BOARD CONNECTION DIAGRAM 88
BLOCK DIAGRAM 90
Electronic viewfinder 90
Video 91
Deflection 91
Audio 91
Preamp 91
Mother 91
VTR Interface 91
µCOM-1, -2 94
VTR Control 94
Function 94
SCHEMATIC/CIRCUIT BOARD DIAGRAMS 97
EXPLODED VIEW 147
REPLACEMENT PARTS LIST 153

SPECIFICATIONS

System:	Uni-frequency separation system
Signal type:	Based on PAL system
Camera tube:	1/2" SATICON
Synchronization system:	Internal synchronization
Horizontal rezolution:	Better than 250 TV line
Video output:	1 Vp-p 75Ω (Unbalanced)
Video S/N ratio:	45 dB or more
Standard object luminance:	500 lux
Minimum luminance required:	10 lux
Built-in microphone:	Uni-directivity electret condenser microphone
External mic input:	–65 dB, low impedance
Audio line output:	–20 dB, high impedance
Lens (accessory):	F1.4, f = 8.5 – 51 mm zoom (x 6)
Lens mount:	Special mount (with auto focus, auto iris power zoom, macro mechanism)
Dia. of filter screw:	52 mm, thread pitch 0.75 mm
Viewfinder:	Electronic viewfinder system Cathode ray tube: 1" cathode ray tube Display function: Operation check for camera set-up, Calendar, Time, Stopwatch, Title 1, Title 2, Record, Fade, Warning/Alarm for Battery, White balance and Lighting
Color temperature control:	From tungsten bulb illumination to cloudy weather (color filter concurrently used)
Automatic sensitivity control range:	10 – 100,000 lux
Power voltage:	DC 12 V
Power consumption:	4.4 W (When Auto focus switch is "OFF")
External dimensions:	193(W) x 230(H) x 453(D) mm (Electronic viewfinder and attached mic included)
Weight:	2.6 kg (Electronic viewfinder, attached microphone included)
Accessories:	Electronic viewfinder x 1 Boom microphone x 1

* The specifications and external appearance of this unit may be changed without notice for improvement

KEY TO ILLUSTRATIONS

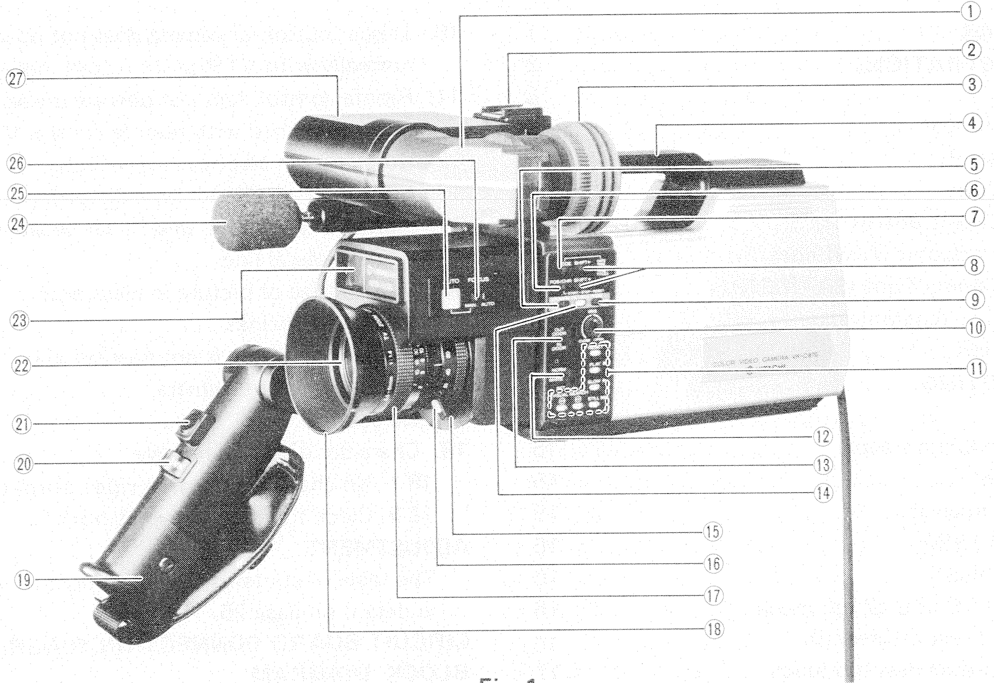


Fig. 1

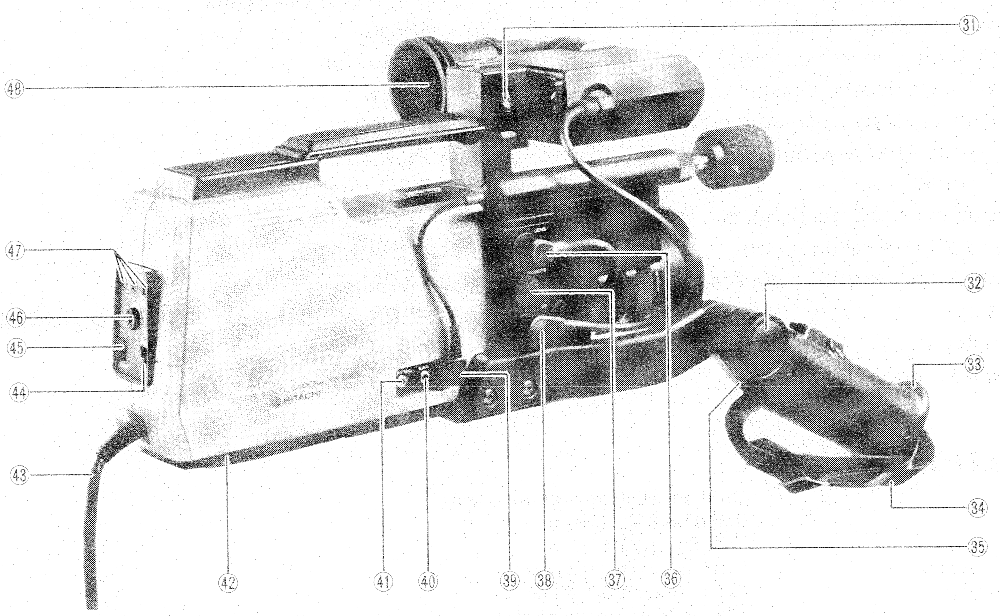


Fig. 2

1. Rotary neck
2. Adaptor shoe
3. Eye cup
4. Grip
5. CHK/CLR switch
6. POS/CHR switch
7. EVF display controls
8. POS/CHR shift switches
9. Fade switch
10. Iris control knob
11. VTR remote controls
12. White balance set switch
13. Outdoor/Indoor select switch
14. Instant review switch
15. Zoom lever
16. Macro switch
17. Focus adjust ring
18. Lens hood
19. Battery compartment
20. Power zoom switch
21. Start/stop switch
22. Zoom lens
23. Rangefinder window
24. Boom microphone
25. Auto focus switch
26. Focus/AUTO/MANUAL select switch
27. Electronic viewfinder
31. Electronic viewfinder lock screw
32. Grip lock screw
33. Grip
34. Hand strap
35. Grip release button
36. Lens connection terminal
37. Camera remote controls connection terminal
38. Electronic viewfinder connection terminal
39. Boom microphone connection terminal
40. Earphone jack
41. External microphone jack
42. Sholder pad
43. Camera cable
44. NEG/NOR select switch
45. Stand-by switch
46. Color balance control knob
47. CALENDER SET switches
48. Diopter control ring

DISASSEMBLY

Names of circuit boards

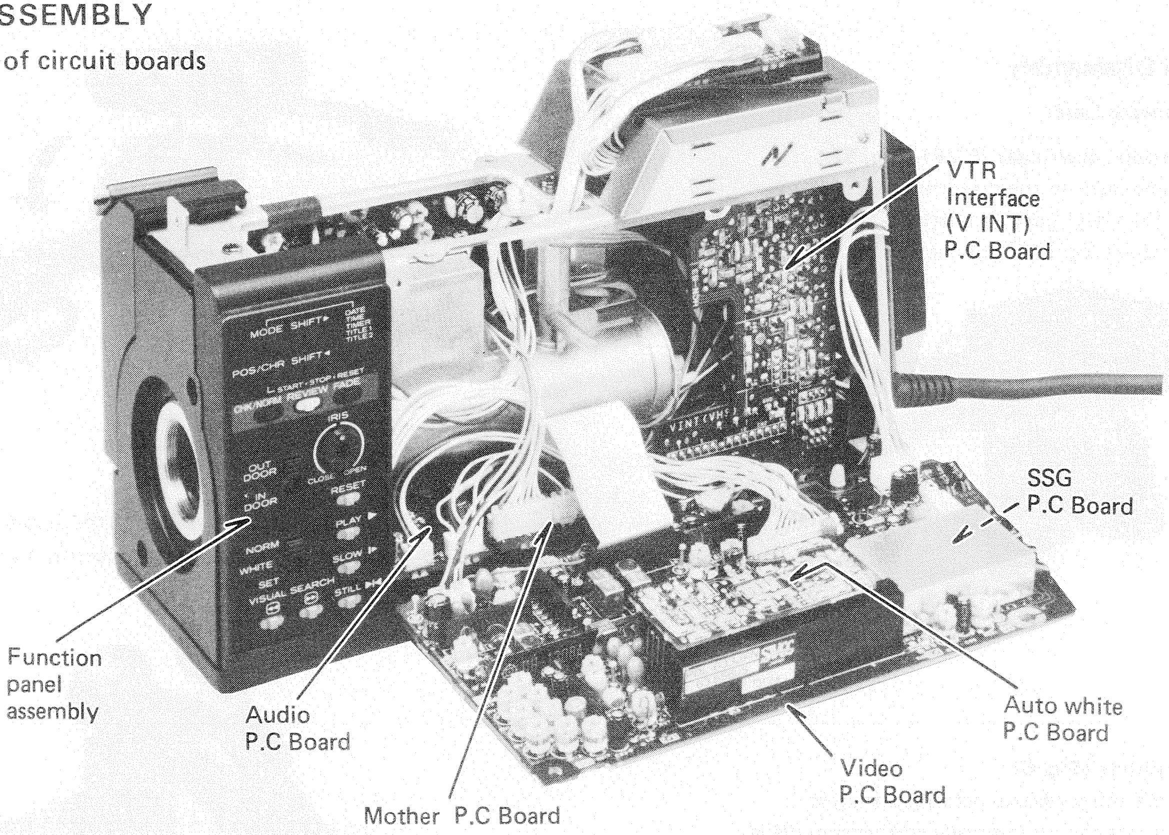

VTR Interface (V INT) P.C Board
SSG P.C Board
Function panel assembly
Audio P.C Board
Mother P.C Board
Video P.C Board
Auto white P.C Board

Fig. 3

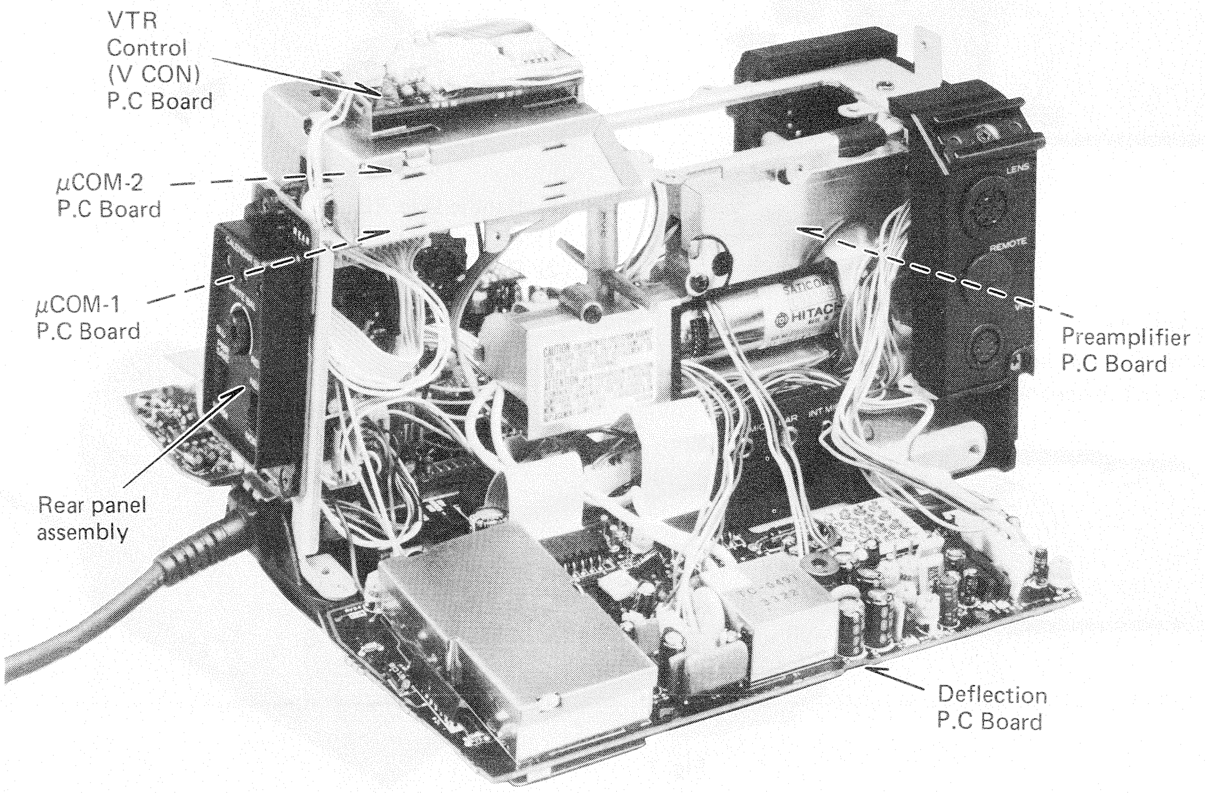

VTR Control (V CON) P.C Board
μCOM-2 P.C Board
μCOM-1 P.C Board
Rear panel assembly
Preamplifier P.C Board
Deflection P.C Board

Fig. 4

Camera Disassembly

1. Removing Cases

1. Electronic viewfinder (EVF) (Fig. 5)

1) Push the lever in the direction of the arrow.
2) Turn the viewfinder installation screw.
3) Disconnect the EVF connection cable.

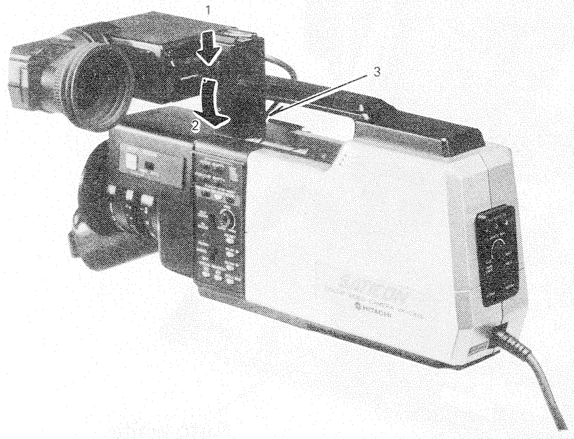


Fig. 5

2. Microphone (Fig. 6)

1) Turn the microphone installation screw.
2) Disconnect the microphone connection cable.
3) Remove the microphone in the direction of the arrow.

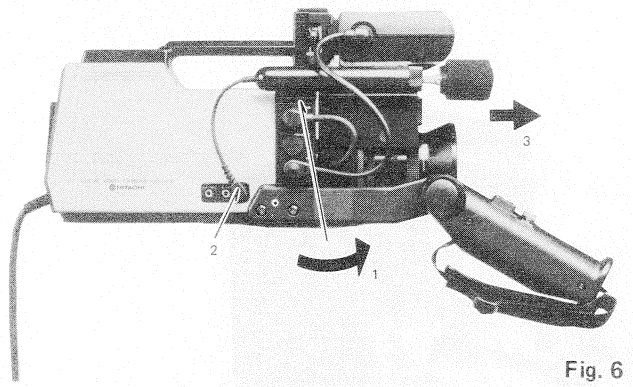


Fig. 6

3. Grip (Fig. 7)

1) Remove 2 screws holding the grip.
2) Disconnect the connector CN1061.

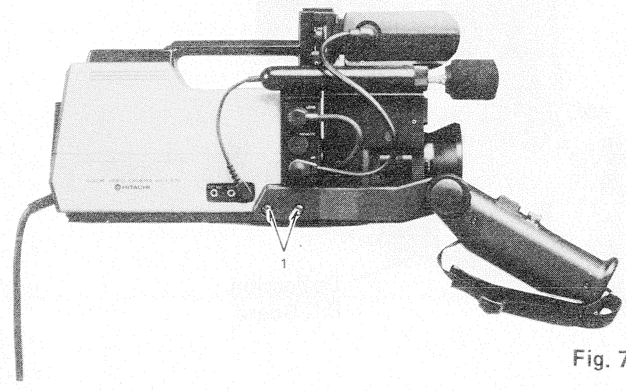


Fig. 7

4. Lens (Fig. 8)

1) Remove the grip.
2) Disconnect the lens connector.
3) Turn the lens in the direction of the arrow.

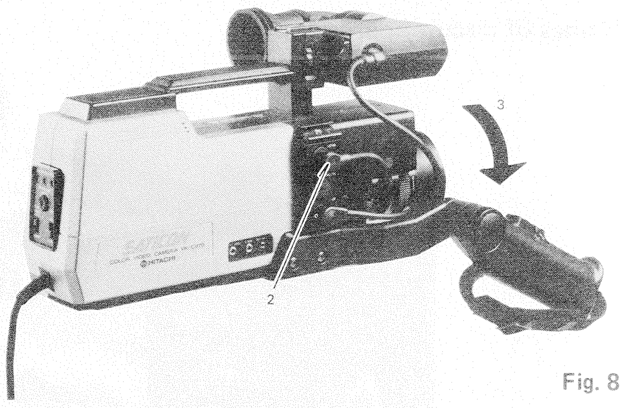


Fig. 8

5. Covers (Fig. 9)

1) Remove 2 screws.
2) Remove the covers in the direction of the arrow.

Note: The tabs are provided on the covers, so remove and reinstall both covers.

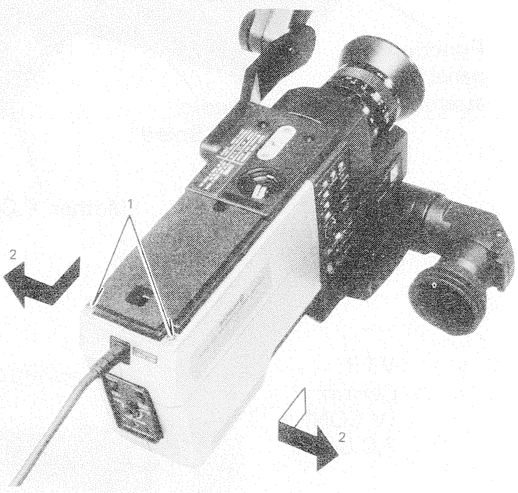


Fig. 9

6. Handle (Fig. 10)

1) Remove the lens.
2) Remove the cover.
3) Remove 3 screws.

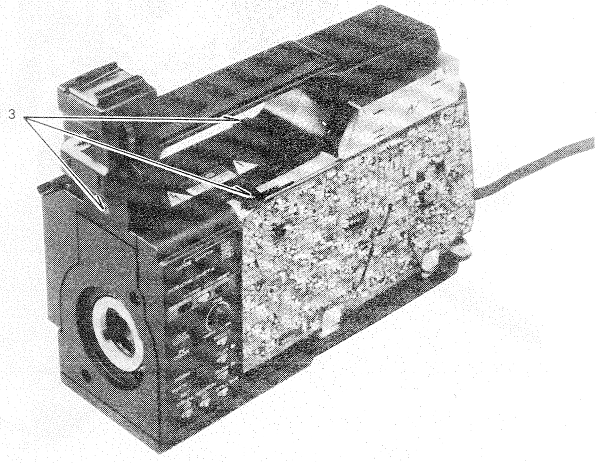


Fig. 10

2. Removing Circuit Boards

Disassemble the cases as previously given.

1. Vdieo circuit board. (Fig. 11, 12)

1) Remove 2 screws. (Fig. 11)
2) Unsolder the lead. (Fig. 11)

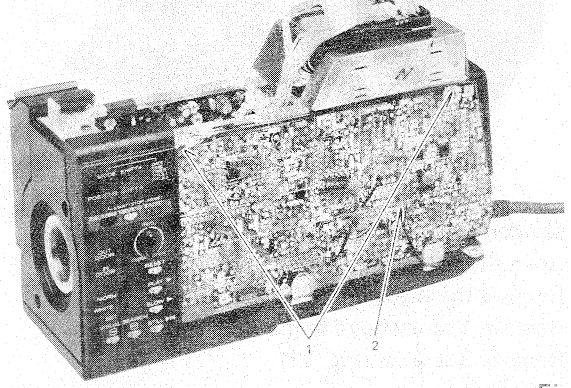


Fig. 11

3) Disconnect connectors CN1, CN2, CN3 and CN4. (Fig. 12)
4) Release the stoppers of the board hinges.

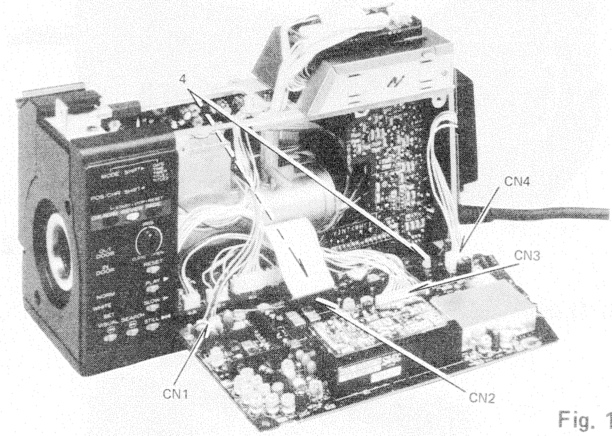


Fig. 12

2. Defliction circuit board (Fig. 13, 14, 15)

1) Remove 2 screws. (Fig. 13)

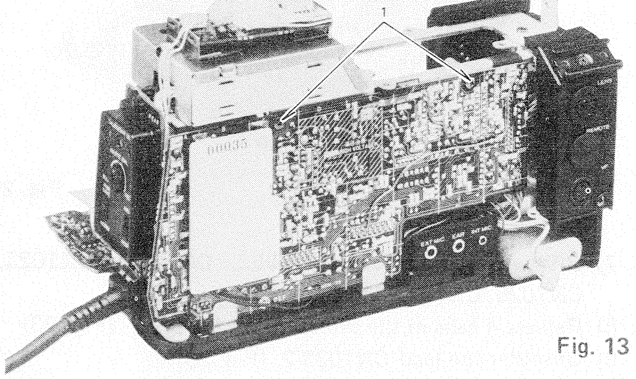


Fig. 13

2) Remove 2 screws. (Fig. 14)
3) Remove the SATICON socket shield plate in the direction of the arrow. (Fig. 14)

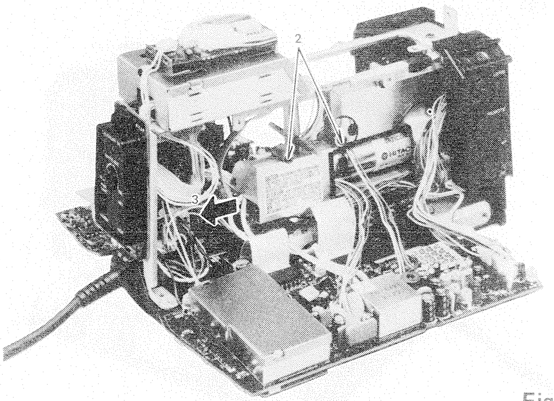


Fig. 14

4) Unsolder the lead. (Fig. 15)
5) Remove the SATICON socket in the direction of the arrow. (Fig. 15)
6) Disconnect connectors CN301 – CN303 and CN305 – CN307. (Fig. 15)

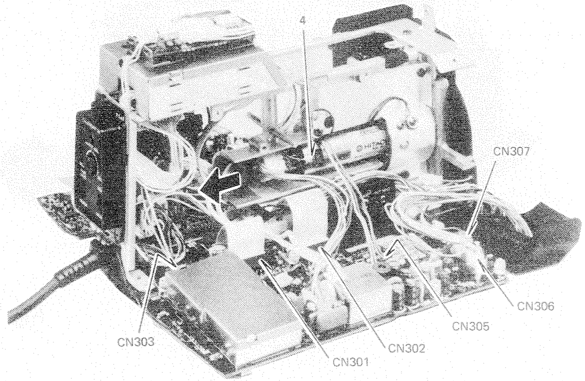


Fig. 15

3. Preamplifier circuit board (Fig. 16, 17, 18)

1) Open the video board and deflection board.
2) Disconnect connector CN1. (Fig. 16)

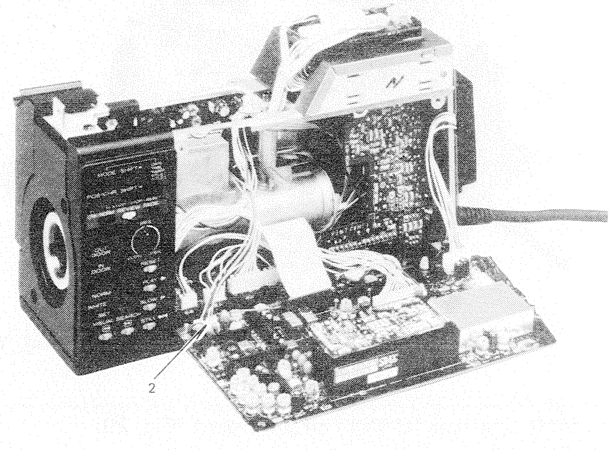


Fig. 16

3) Remove 2 screws holding the connector holder. (Fig. 17)

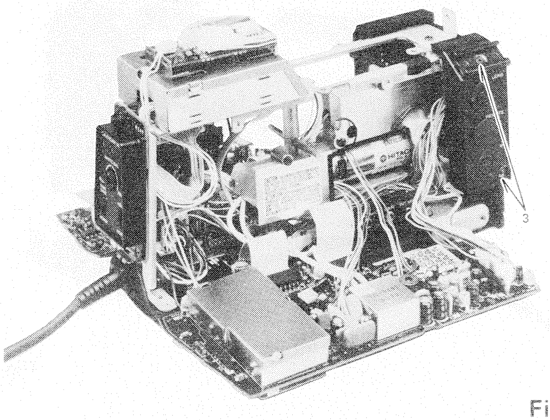


Fig. 17

4) Remove 5 screws and remove the shield. (Fig. 18)

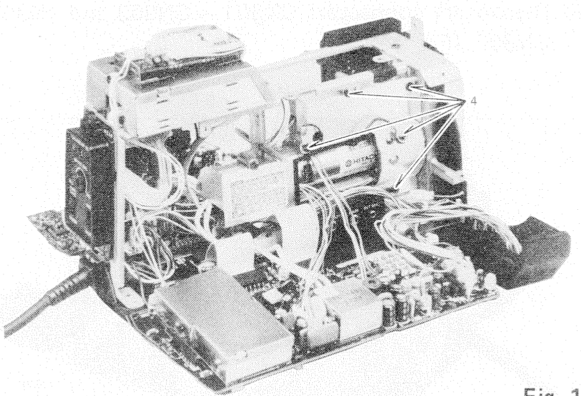


Fig. 18

5) Unsolder the target lead. (Fig. 19)
6) Remove 2 screws and remove the preamplifier in the direction of the arrow. (Fig. 19)

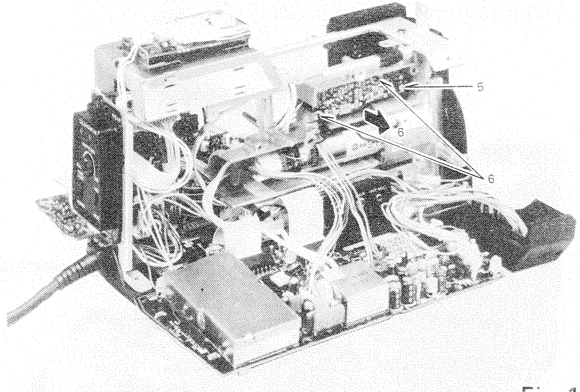


Fig. 19

4. VTR interface (V INT) circuit board (Fig. 20)

1) Open the video board.
2) Remove 1 screw.
3) Remove the V INT board in the direction of the arrow from CN1026.
4) Disconnect connectors CN605 – CN603 and CN601.

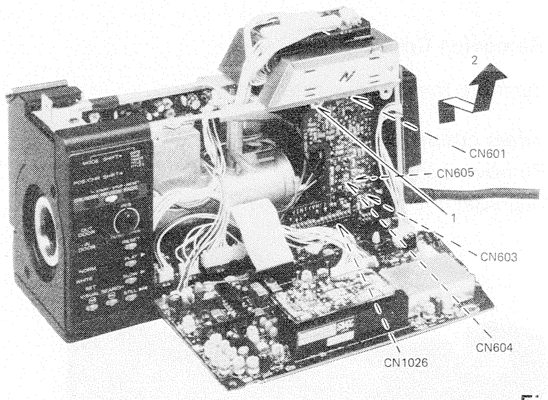


Fig. 20

5. Mother circuit board (Fig. 21, 22, 23)

1) Open the defliction board.
2) Remove the video board.
3) Remove 1 screw holding the VTR interface board.
4) Remove 3 screws. (Fig. 21)
5) Open the botton cover in the direction of the arrow. (Fig. 21)

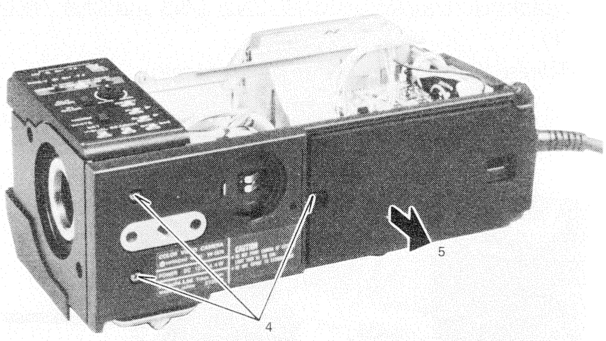


Fig. 21

6) Disconnect connectors CN302 and CN303. (Fig. 22)

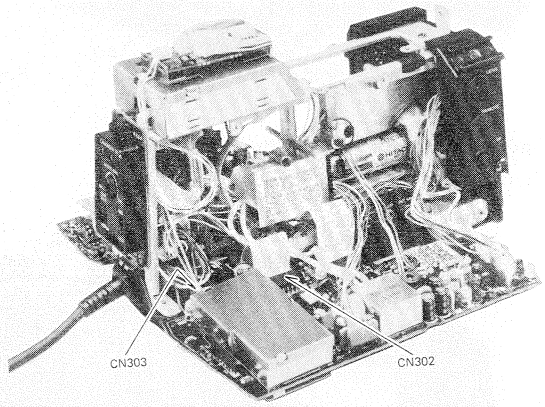


Fig. 22

7) Disconnect connectors CN953, CN1021 – CN1023, CN1026, CN1027 and CN1030. (Fig. 23)
8) Release 4 tabs in the direction of the arrow. (Fig. 23)
9) Unsolder the lead CN1023-2. (Fig. 23)

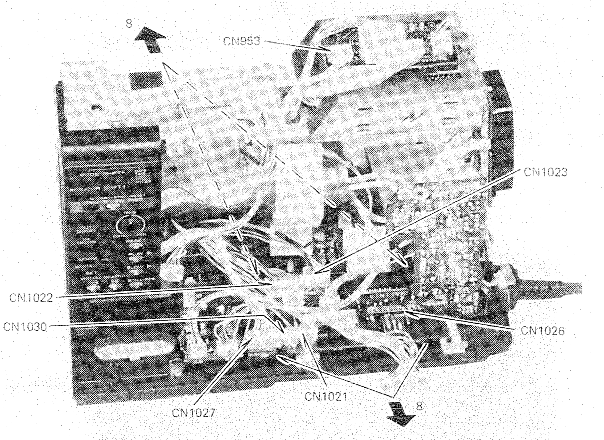

8
CN953
CN1023
CN1022
CN1030
CN1026
CN1021
CN1027
8

Fig. 23

6. Audio circuit board. (Fig. 24)

1) Open the defliction board.
2) Remove the video board.
3) Remove 1 screw holding the VTR interface board.
4) Remove 3 screws. (Fig. 21)
5) Open the bottom cover in the direction of the arrow. (Fig. 21)
6) Disconnect connector CN603 and CN1021. (Fig. 24)
7) Remove 1 screw. (Fig. 24)

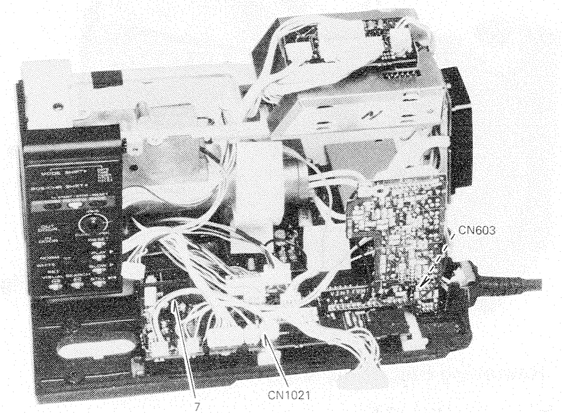

CN603
7
CN1021

Fig. 24

7. Zoom circuit board (Fig. 25, 26, 27)

1) Remove 3 screws. (Fig. 25)

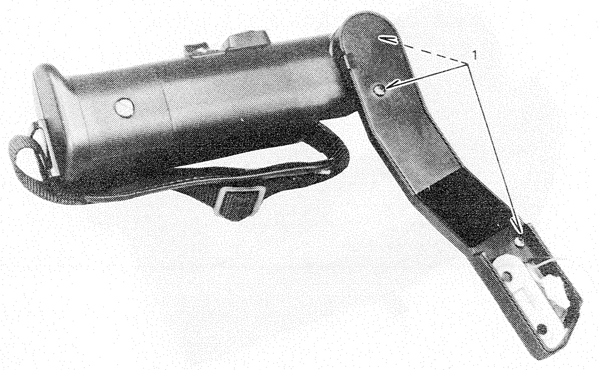


Fig. 25

2) Remove 2 screws. (Fig. 26)
3) Turn the screw to remove it (Fig. 26)

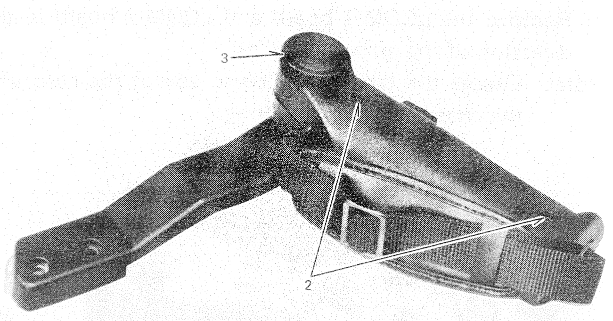


Fig. 26

4) Remove the zoom board in the direction of the arrow. (Fig. 27)

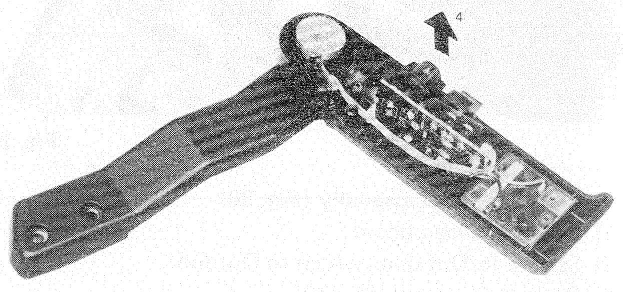


Fig. 27

8. μCOM-1/μCOM-2/VTR control circuit board (Fig. 28, 29)

1) Open the deflection board.
2) Disconnect connectors CN951 – CN954. (Fig. 28)
3) Push the VTR control board holder in the direction of the arrow. (Fig. 28)
4) Remove 1 screw and remove the cover in the direction of the arrow. (Fig. 28)
5) Disconnect connector CN601. (Fig. 28)

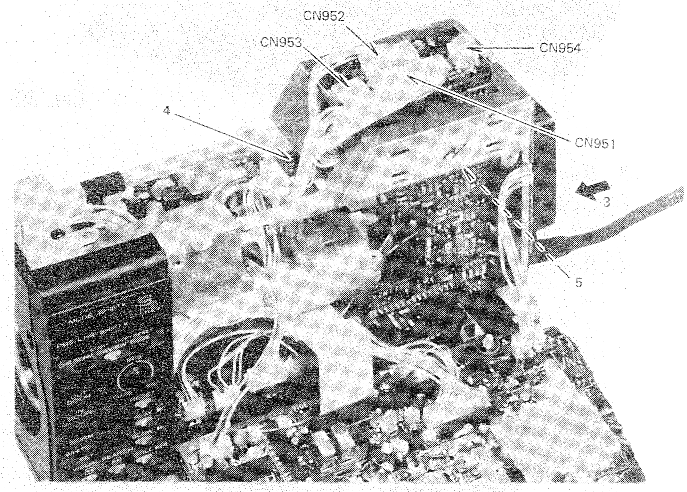

CN952
CN953
CN954
4
CN951
3
5

Fig. 28

6) Remove the μCOM-1 board and μCOM-2 board in the direction of the arrow. (Fig. 29)

Note: Engage the tab on the lower side of the case with the chassis when reinstalling.

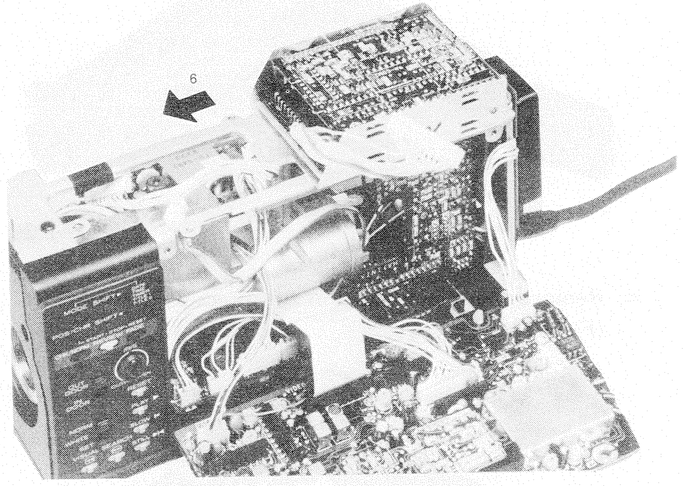


Fig. 29

9. Function panel assembly (Fig. 30)

1) Open the video board.
2) Set the In/Out door switch to Outdoor.
3) Remove 3 screws. (Fig. 30)
4) Disconnect connectors CN1027 and CN952. (Fig. 30)

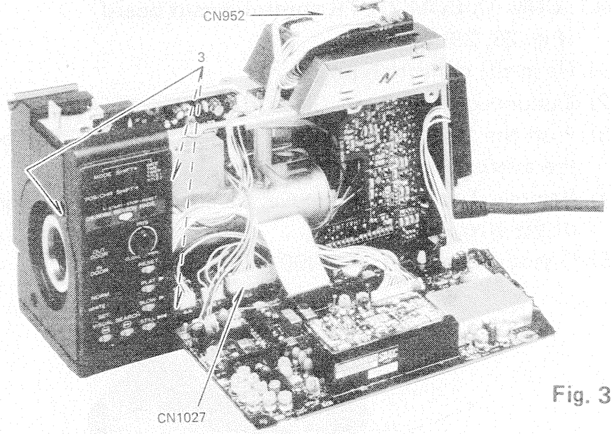


Fig. 30

10. Rear panel assembly (Fig. 31)

1) Open the video board and deflection board.
2) Disconnect connectors CN954 and CN303. (Fig. 31)
3) Remove 2 screws and remove rear panel. (Fig. 31)

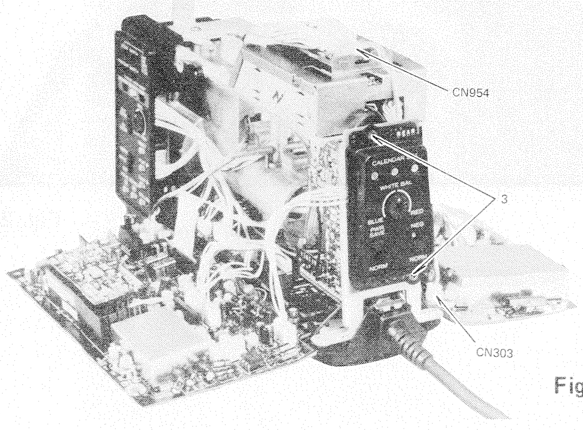


Fig. 31

11. SSG circuit board (Fig. 32)

The SSG board is soldered to the video board.

1) Open the video board.
2) Unsolder the shield cover.
3) Unsolder the SSG board.

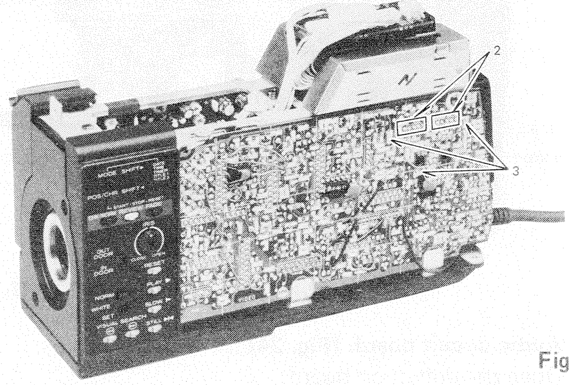


Fig. 32

12. Auto white circuit board (Fig. 33)

The auto white board is soldered to the video board.

1) Open the video board.
2) Unsolder the auto white board.

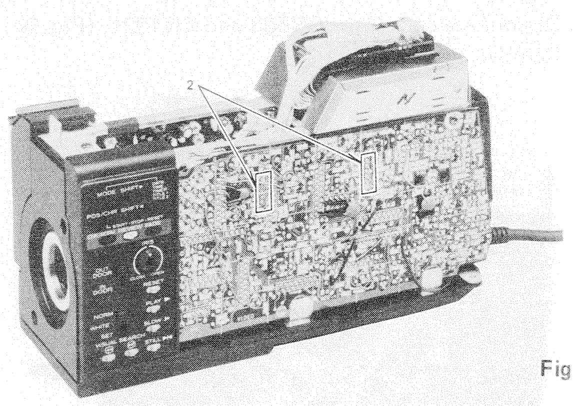


Fig. 33

3. Removing Electronic Viewfinder

1. Top case (Fig. 34)

1) Remove 3 screws. (Fig. 34)
2) Press the top cover to release the locking tab and gently pull apart and remove the top cover. (Fig. 34)

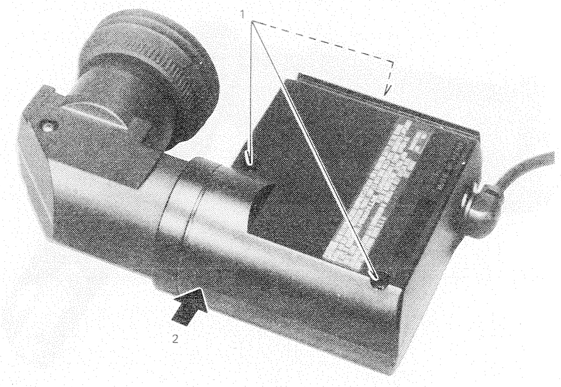


Fig. 34

2. Electronic viewfinder circuit board (EVF-1, EVF-2) (Fig. 35, 36)

1) Remove the top cover.
2) Remove the EVF-2 board in the direction of the arrow. (Fig. 35)

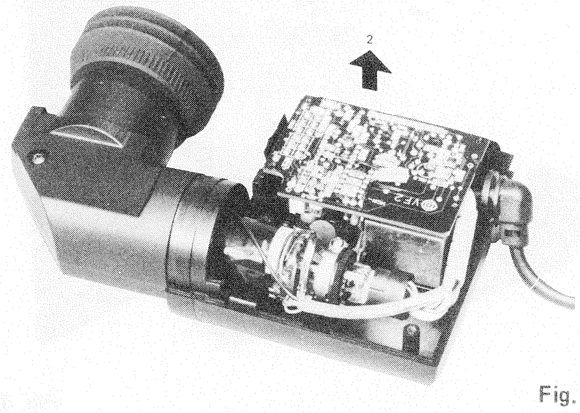


Fig. 35

3) Disconnect connectors CN1152 and CN1101. (Fig. 36)
4) Release 2 tabs in the direction of the arrow to remove the EVF-1 board. (Fig. 36)

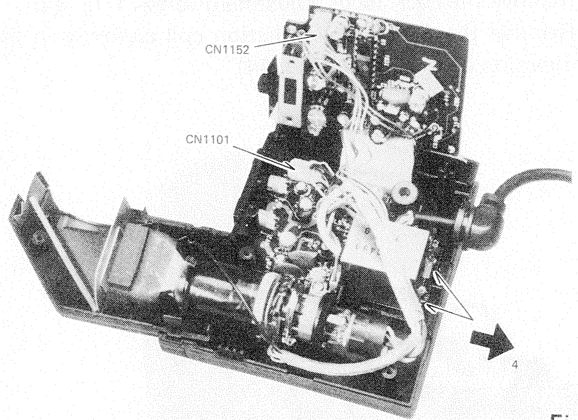


Fig. 36

3. CRT (Fig. 37, 38, 39)

1) Remove the top cover.
2) Remove 1 screw holding the neck cover. (Fig. 37)
3) Remove the EVF-2 board in the direction of the arrow. (Fig. 37)

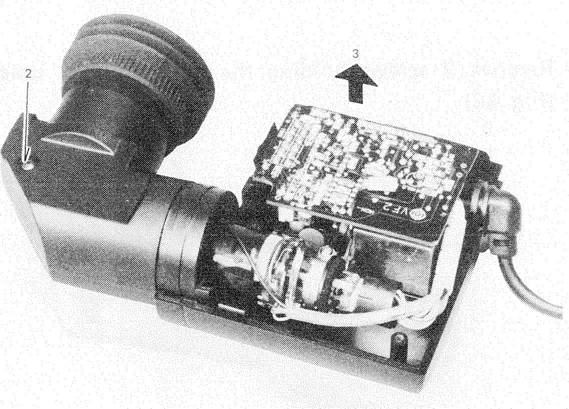


Fig. 37

4) Disconnect connector CN1152. (Fig. 38)
5) Release the lead wire holder. (Fig. 38)
6) Remove the CRT socket. (Fig. 38)
7) Remove the CRT assembly. (Fig. 38)

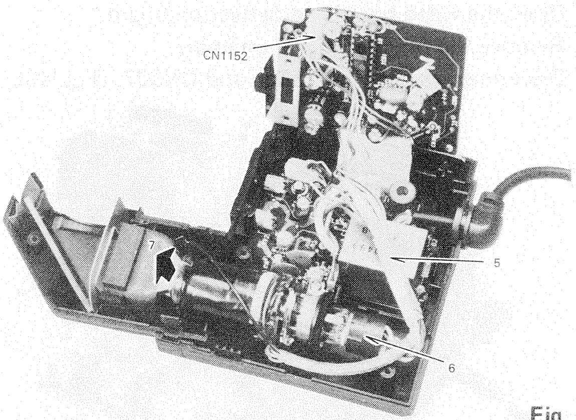


Fig. 38

8) Loose 1 screw and disconnect the CRT in the direction of the arrow. (Fig. 39)

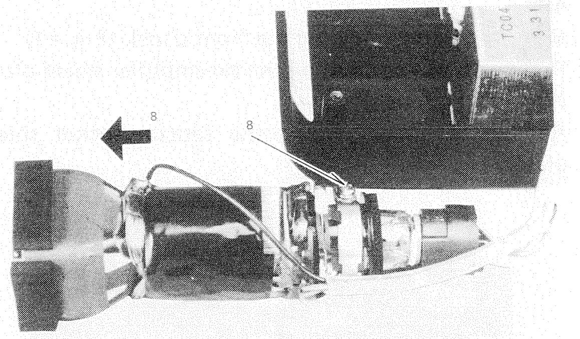


Fig. 39 (A)

Note: Install the Deflection coil by sliding it fully to the CRT screen side (in the direction of the arrow) so that the deflection coil lead wire passing window and pin 1 of the CRT socket (white thick lead) align. (Fig. 39 (B))

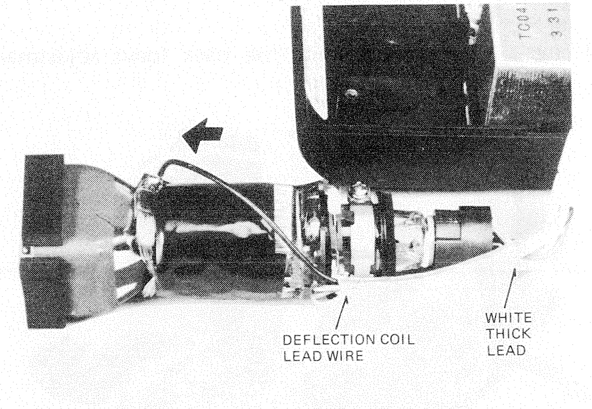


Fig. 39 (B)

4. Removing Camera Tube (SATICON)/Deflection Coil Assembly

Turn off the power before replacing this.
Disassemble the cases as previously given.

1) Open the video board and deflection board.
2) Remove the function panel assembly.
3) Disconnect connector CN305 and CN307. (Fig. 40)

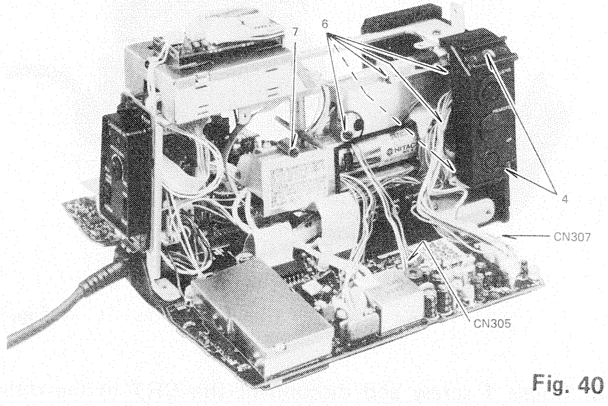


Fig. 40

4) Remove 2 screws holding the connector holder. (Fig. 40)
5) Remove 2 screws holding the front panel. (Fig. 41)
6) Remove 5 screws holding the preamplifier shield plate. (Fig. 40)
7) Remove 1 screw holding the saticon socket shield plate. (Fig. 40)

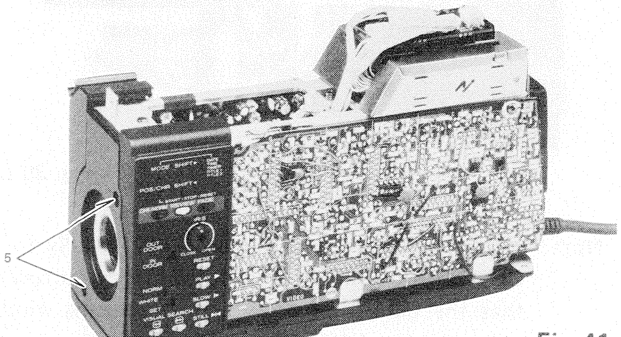


Fig. 41

8) Unsolder the target lead. (Fig. 42)
9) Unsolder the lead and remove the saticon socket. (Fig. 42)
10) Remove 1 screw holding the back focus adjustment screw holder. (Fig. 42)

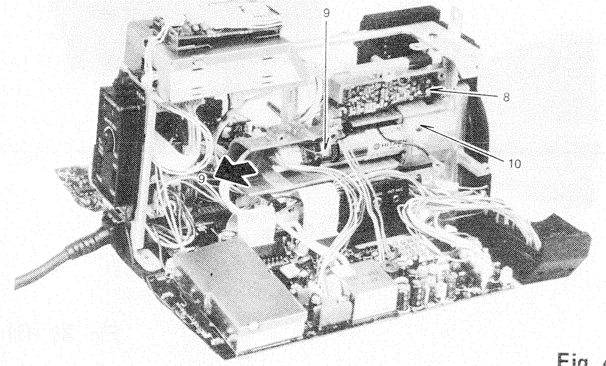


Fig. 42

11) Remove 4 screws holding the lens holder. (Fig. 43)

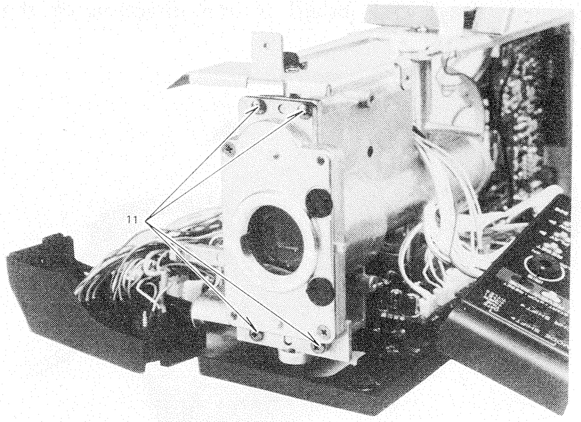


Fig. 43

12) Remove the back focus adjustment screw holder in the direction of the arrow. (Fig. 44)
13) Remove the back focus adjustment screw. (Fig. 44)
14) Remove the SATICON/defliction coil assembly in the direction of the arrow. (Fig. 44)

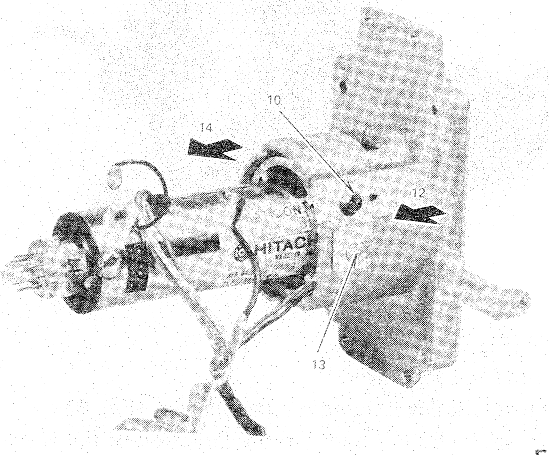


Fig. 44

15) Remove 2 screws holding the defliction coil holder. (Fig. 45)

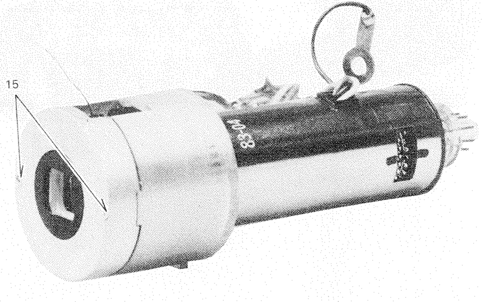


Fig. 45

16) Install by the reverse procedure to disassembly.

17) Perform adjustment after replacing the camera tube/coil ass'y.

Note:

1. Use gloves when replacing the camera tube/coil ass'y so that fingerprints and dust do not adhere to the surface or walls of the camera tube. Fingerprints and dust have a bad effect on the picture. Wipe off using chamois leather or lens cleaning paper when any dirt adheres.
2. Azimuth adjustment between the tube and deflection coil and alignment adjustment have been performed in the factory before shipment, so do not loosen the tube fixing screw or internal tube clamp screw and do not turn the alignment magnets.

5. Removing Lens

1. Lens hood (Fig. 46)

1) Turn to remove it.

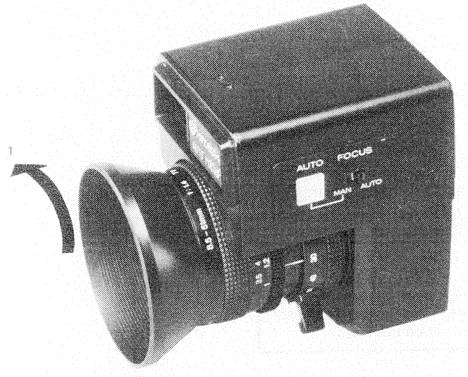


Fig. 46

2. Front cover (Fig. 47)

1) Remove 2 screws.

2) Loose 1 screw.

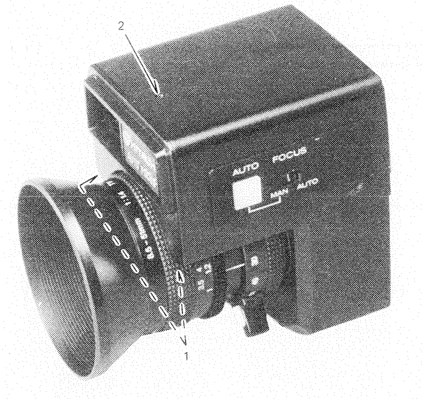


Fig. 47

3. Side covers (Fig. 48)

1) Remove 9 screws holding the side covers.

2) Remove the left cover in the direction of the arrow.

3) After removing the right cover in the direction of the arrow, release the cable holder from the cover and remove the cable in the direction of the arrow.

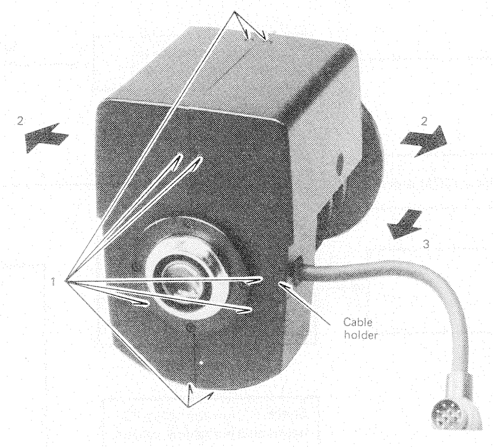


Fig. 48

4. Zoom motor (Fig. 49)

1) Remove 2 screws.

2) Unsolder the lead.

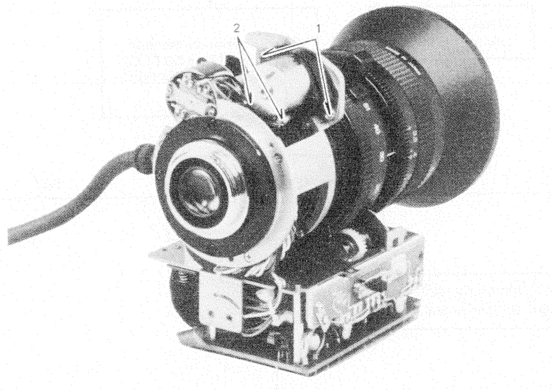


Fig. 49

5. Focus auto/manual switch (Fig. 50)

1) Remove 2 screws.

2) Unsolder the lead.

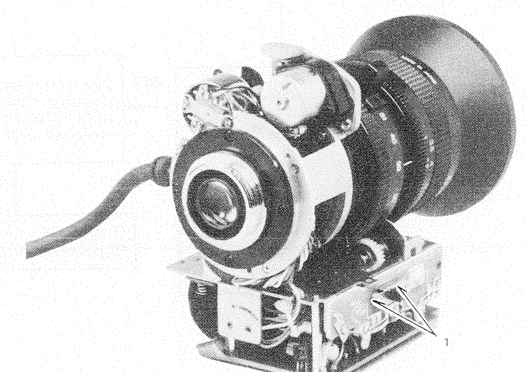


Fig. 50

MEMO

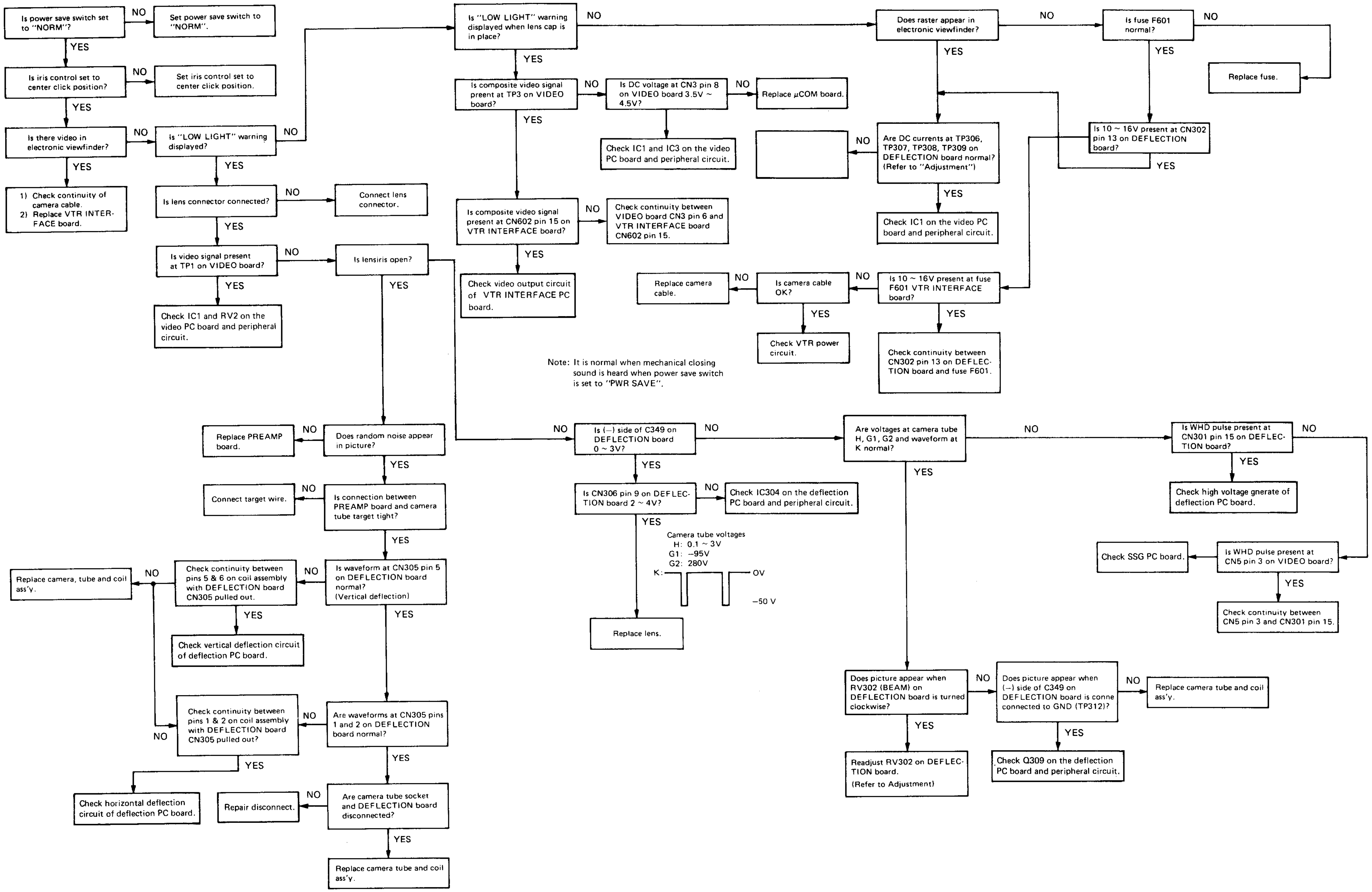
TROUBLESHOOTING

Check the following before checking the circuit

1) Connection of each connector and all operation switch positions.

2) Power voltage supplied to camera.

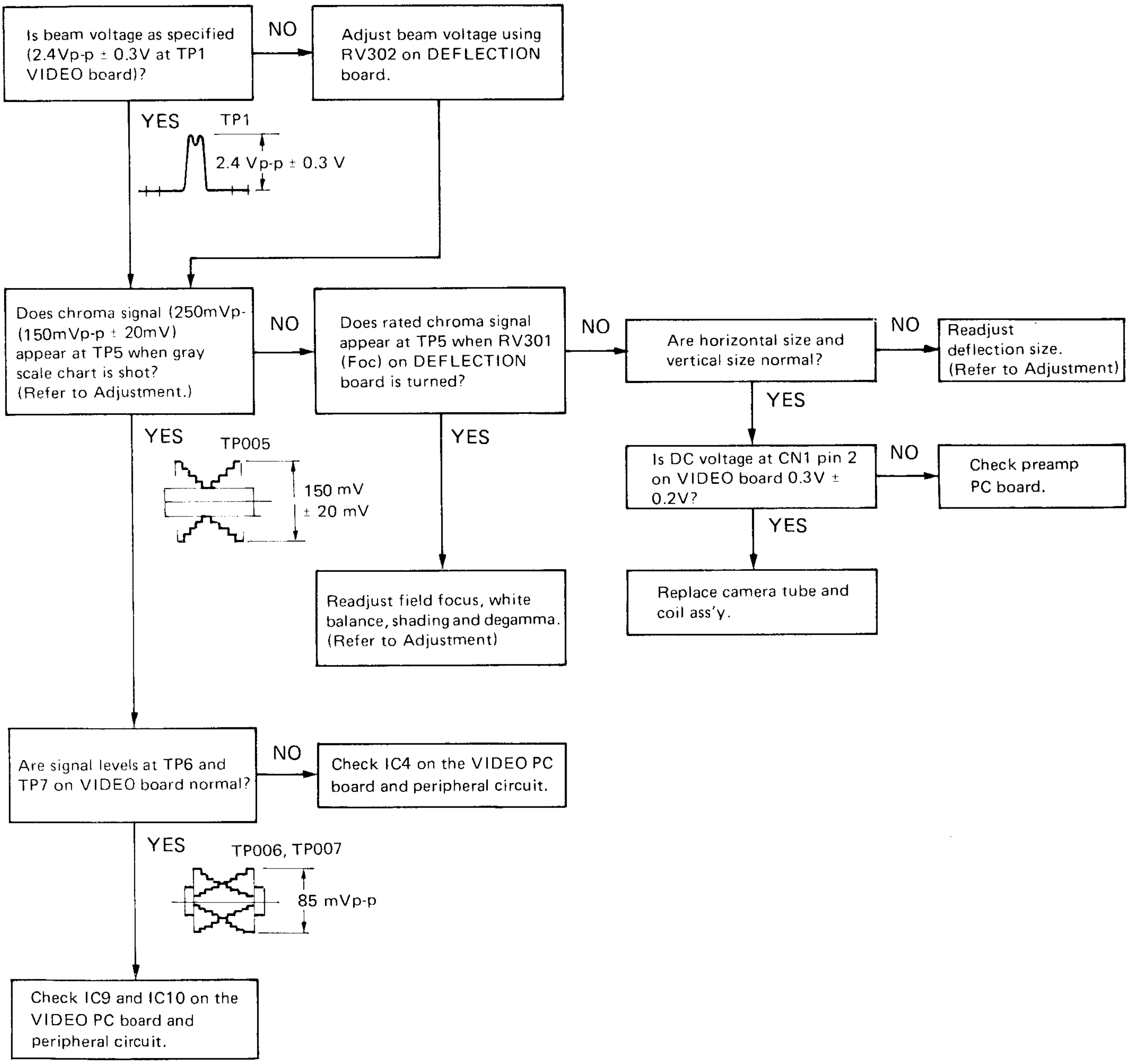
1. No picture



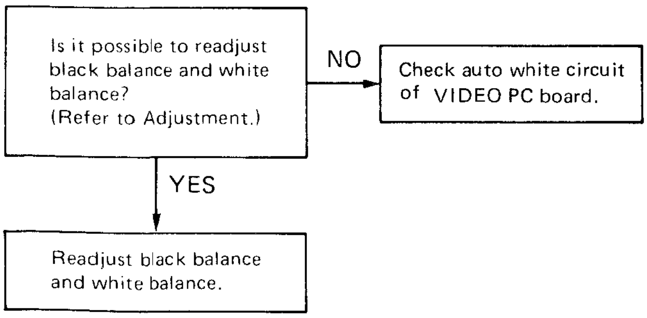
Is power save switch set to "NORM"?
Set power save switch to "NORM".
Is iris control set to center click position?
Set iris control set to center click position.
Is there video in electronic viewfinder?
Is "LOW LIGHT" warning displayed?
1) Check continuity of camera cable.
2) Replace VTR INTERFACE board.
Is lens connector connected?
Connect lens connector.
Is video signal present at TP1 on VIDEO board?
Is lensiris open?
Check IC1 and RV2 on the video PC board and peripheral circuit.
Is "LOW LIGHT" warning displayed when lens cap is in place?
Is composite video signal preent at TP3 on VIDEO board?
Is DC voltage at CN3 pin 8 on VIDEO board 3.5V ~ 4.5V?
Replace μCOM board.
Check IC1 and IC3 on the video PC board and peripheral circuit.
Is composite video signal present at CN602 pin 15 on VTR INTERFACE board?
Check continuity between VIDEO board CN3 pin 6 and VTR INTERFACE board CN602 pin 15.
Check video output circuit of VTR INTERFACE PC board.
Note: It is normal when mechanical closing sound is heard when power save switch is set to "PWR SAVE".
Does raster appear in electronic viewfinder?
Is fuse F601 normal?
Replace fuse.
Are DC currents at TP306, TP307, TP308, TP309 on DEFLECTION board normal? (Refer to "Adjustment")
Is 10 ~ 16V present at CN302 pin 13 on DEFLECTION board?
Check IC1 on the video PC board and peripheral circuit.
Replace camera cable.
Is camera cable OK?
Is 10 ~ 16V present at fuse F601 VTR INTERFACE board?
Check VTR power circuit.
Check continuity between CN302 pin 13 on DEFLECTION board and fuse F601.
Replace PREAMP board.
Does random noise appear in picture?
Connect target wire.
Is connection between PREAMP board and camera tube target tight?
Replace camera, tube and coil ass'y.
Check continuity between pins 5 & 6 on coil assembly with DEFLECTION board CN305 pulled out.
Is waveform at CN305 pin 5 on DEFLECTION board normal? (Vertical deflection)
Check vertical deflection circuit of deflection PC board.
Check continuity between pins 1 & 2 on coil assembly with DEFLECTION board CN305 pulled out?
Are waveforms at CN305 pins 1 and 2 on DEFLECTION board normal?
Check horizontal deflection circuit of deflection PC board.
Repair disconnect.
Are camera tube socket and DEFLECTION board disconnected?
Replace camera tube and coil ass'y.
Is (−) side of C349 on DEFLECTION board 0 ~ 3V?
Is CN306 pin 9 on DEFLECTION board 2 ~ 4V?
Check IC304 on the deflection PC board and peripheral circuit.
Camera tube voltages
H: 0.1 ~ 3V
G1: −95V
G2: 280V
K:
0V
−50 V
Replace lens.
Are voltages at camera tube H, G1, G2 and waveform at K normal?
Is WHD pulse present at CN301 pin 15 on DEFLECTION board?
Check high voltage gnerate of deflection PC board.
Check SSG PC board.
Is WHD pulse present at CN5 pin 3 on VIDEO board?
Check continuity between CN5 pin 3 and CN301 pin 15.
Does picture appear when RV302 (BEAM) on DEFLECTION board is turned clockwise?
Does picture appear when (−) side of C349 on DEFLECTION board is conne connected to GND (TP312)?
Replace camera tube and coil ass'y.
Readjust RV302 on DEFLECTION board. (Refer to Adjustment)
Check Q309 on the deflection PC board and peripheral circuit.
YES
NO

2. Color reproduction poor

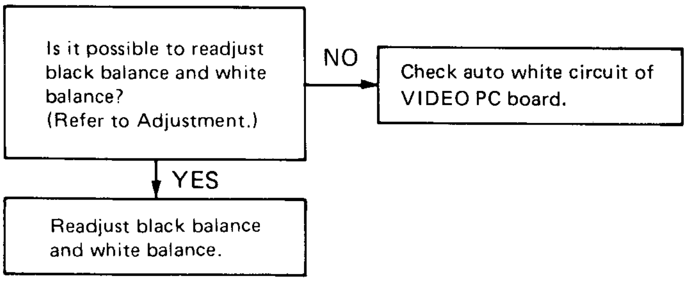
1-1. Greenish


Is beam voltage as specified (2.4Vp-p ± 0.3V at TP1 VIDEO board)?
NO
Adjust beam voltage using RV302 on DEFLECTION board.
YES
TP1
2.4 Vp-p ± 0.3 V
Does chroma signal (250mVp- (150mVp-p ± 20mV) appear at TP5 when gray scale chart is shot? (Refer to Adjustment.)
NO
Does rated chroma signal appear at TP5 when RV301 (Foc) on DEFLECTION board is turned?
NO
Are horizontal size and vertical size normal?
NO
Readjust deflection size. (Refer to Adjustment)
YES
Is DC voltage at CN1 pin 2 on VIDEO board 0.3V ± 0.2V?
NO
Check preamp PC board.
YES
Replace camera tube and coil ass'y.
YES
Readjust field focus, white balance, shading and degamma. (Refer to Adjustment)
YES
TP005
150 mV
± 20 mV
Are signal levels at TP6 and TP7 on VIDEO board normal?
NO
Check IC4 on the VIDEO PC board and peripheral circuit.
YES
TP006, TP007
85 mVp-p
Check IC9 and IC10 on the VIDEO PC board and peripheral circuit.

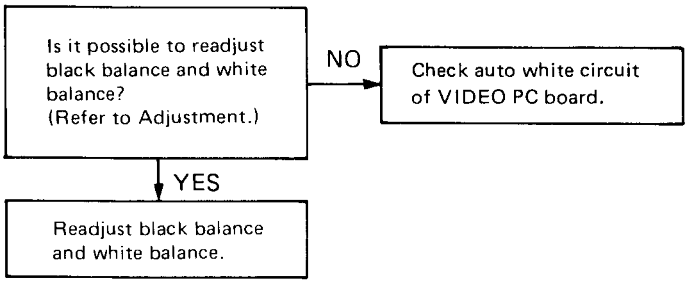
2-2. Picture greenish


Is it possible to readjust black balance and white balance? (Refer to Adjustment.)
NO
Check auto white circuit of VIDEO PC board.
YES
Readjust black balance and white balance.

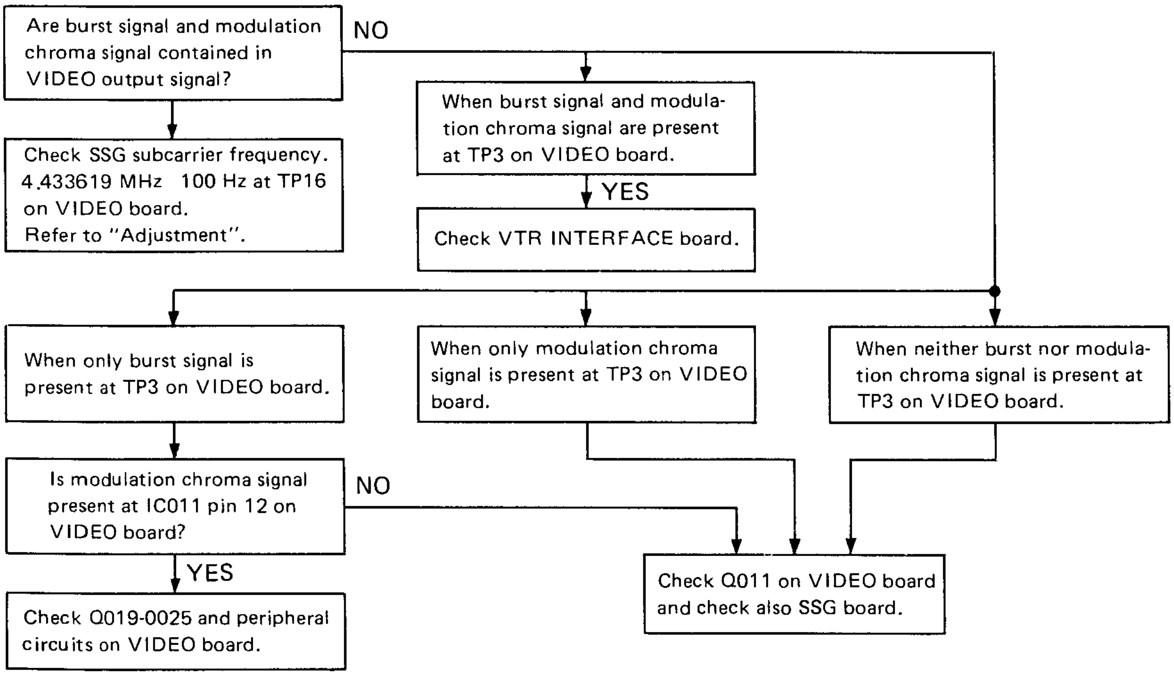
2-3. Picture reddish


Is it possible to readjust black balance and white balance? (Refer to Adjustment.)
NO
Check auto white circuit of VIDEO PC board.
YES
Readjust black balance and white balance.

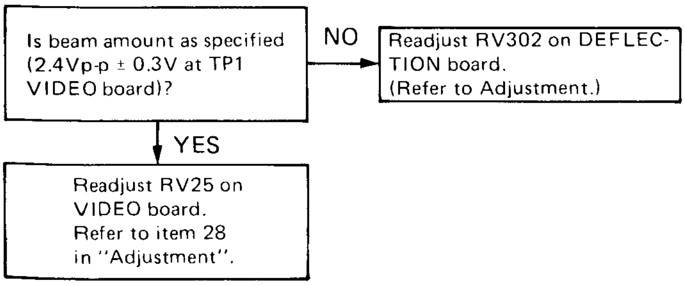
2-4. Picture bluish


Is it possible to readjust black balance and white balance? (Refer to Adjustment.)
NO
Check auto white circuit of VIDEO PC board.
YES
Readjust black balance and white balance.

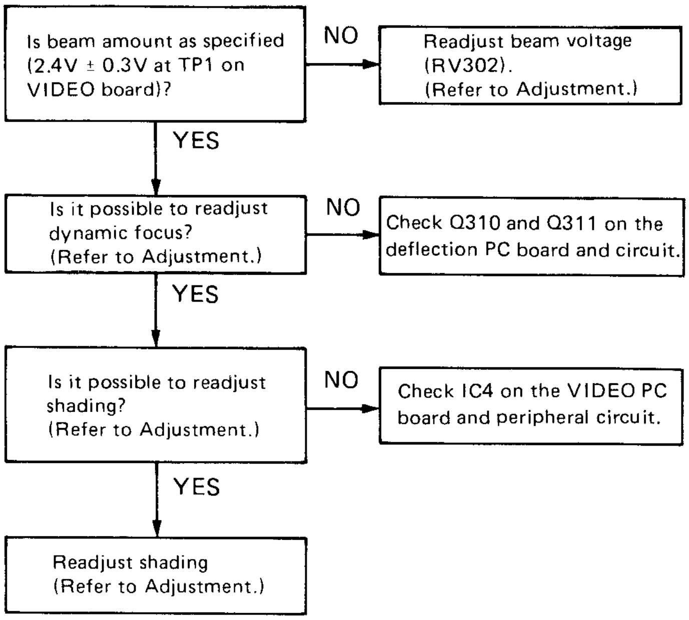
2-5. No color Colored too much


Are burst signal and modulation chroma signal contained in VIDEO output signal?
NO
Check SSG subcarrier frequency. 4.433619 MHz 100 Hz at TP16 on VIDEO board. Refer to "Adjustment".
When burst signal and modulation chroma signal are present at TP3 on VIDEO board.
YES
Check VTR INTERFACE board.
When only burst signal is present at TP3 on VIDEO board.
When only modulation chroma signal is present at TP3 on VIDEO board.
When neither burst nor modulation chroma signal is present at TP3 on VIDEO board.
Is modulation chroma signal present at IC011 pin 12 on VIDEO board?
NO
YES
Check Q019-0025 and peripheral circuits on VIDEO board.
Check Q011 on VIDEO board and check also SSG board.

2-6. Highlight section greenish


Is beam amount as specified (2.4Vp-p ± 0.3V at TP1 VIDEO board)?
NO
Readjust RV302 on DEFLECTION board. (Refer to Adjustment.)
YES
Readjust RV25 on VIDEO board. Refer to item 28 in "Adjustment".

2-7. Color unevenness too much

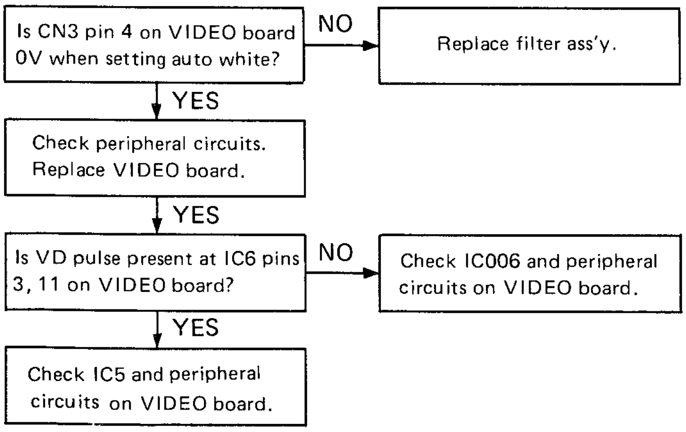

Is beam amount as specified (2.4V ± 0.3V at TP1 on VIDEO board)?
NO
Readjust beam voltage (RV302). (Refer to Adjustment.)
YES
Is it possible to readjust dynamic focus? (Refer to Adjustment.)
NO
Check Q310 and Q311 on the deflection PC board and circuit.
YES
Is it possible to readjust shading? (Refer to Adjustment.)
NO
Check IC4 on the VIDEO PC board and peripheral circuit.
YES
Readjust shading (Refer to Adjustment.)

3. White balance correction not possible

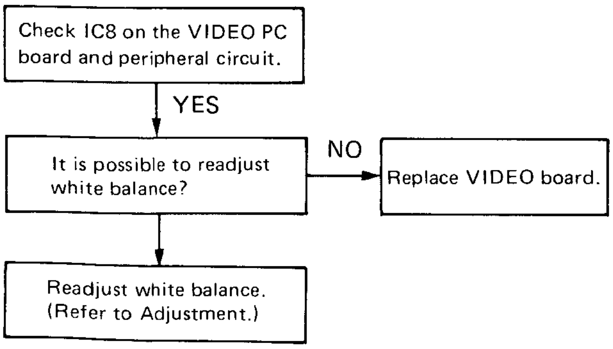
3-1. Tint does not change with position of Indoor/Outdoor switch changed?

Replace filter ass'y.

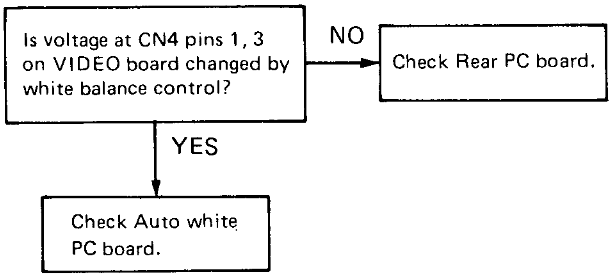
3-2. Auto white set does not operate


Is CN3 pin 4 on VIDEO board 0V when setting auto white?
NO
Replace filter ass'y.
YES
Check peripheral circuits. Replace VIDEO board.
YES
Is VD pulse present at IC6 pins 3, 11 on VIDEO board?
NO
Check IC006 and peripheral circuits on VIDEO board.
YES
Check IC5 and peripheral circuits on VIDEO board.

3-3. White balance drifts when auto white is set


Check IC8 on the VIDEO PC board and peripheral circuit.
YES
It is possible to readjust white balance?
NO
Replace VIDEO board.
Readjust white balance. (Refer to Adjustment.)

3-4. Tint does not change with white balance control turned


Is voltage at CN4 pins 1, 3 on VIDEO board changed by white balance control?
NO
Check Rear PC board.
YES
Check Auto white PC board.

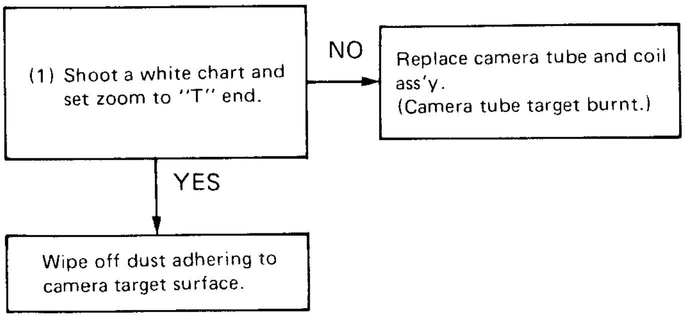
4. Picture missing in horizontal direction

Readjust RV304 on
DEFLECTION board.
(Refer to Adjustment.)

5. Picture missing in vertical direction

Readjust RV306 on
DEFLECTION board.
(Refer to Adjustment.)

6. Abnormal black spot is seen in picture


(1) Shoot a white chart and set zoom to "T" end.
NO
Replace camera tube and coil ass'y.
(Camera tube target burnt.)
YES
Wipe off dust adhering to camera target surface.

- How to discriminate when dust adheres to the camera tube surface

  Dust adhering to the tube surface and scratches (including burn) on the pick-up surface of the camera tube are seen very similar on the TV screen. How to discriminate them is shown in the table.
  Shoot a white chart (or very bright light colored object, etc.)
  When a black or white dot or line adheres in a fixed point on the monitor screen and it does not move to another position when the camera is moved, it is considered to be dust or a scratch (including burn).

How to discriminate dust:

Gradually turn iris control knob in the direction of "CLOSED" to darken the screen. When the noise (dirt) becomes clearer and smaller, and becomes shaded and larger when the screen is returned to the original brightness, it is dust.

How to discriminate scratches and burn:

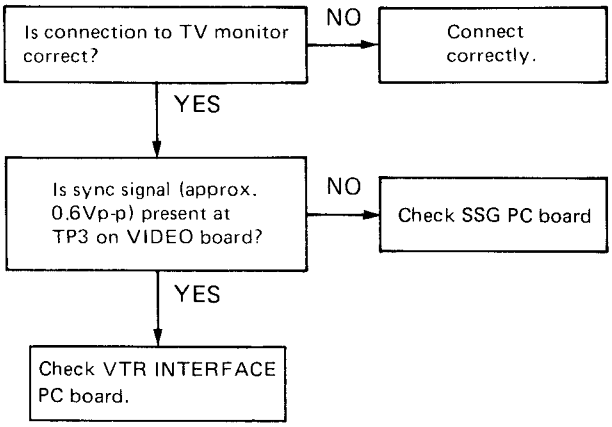
When the iris control knob is turned to make the screen dark but the shading size of the noise on the screen does not change, it is considered to be scratches or burn.

- Removing dust

  Remove the lens and clean the pick-up surface of the SATICON using cleaning bar (cotton bud).
  (Refer to "Disassembly")

  Note: The position of dust on the TV screen and the position of dust with the camera tube viewed from the front have point symmetry (because the picture on the monitor is in reverse to the actual picture).

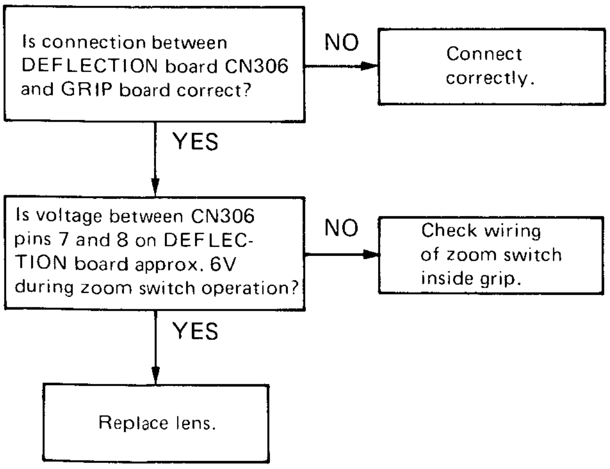
7. Sync distortion


Is connection to TV monitor correct?
NO
Connect correctly.
YES
Is sync signal (approx. 0.6Vp-p) present at TP3 on VIDEO board?
NO
Check SSG PC board
YES
Check VTR INTERFACE PC board.

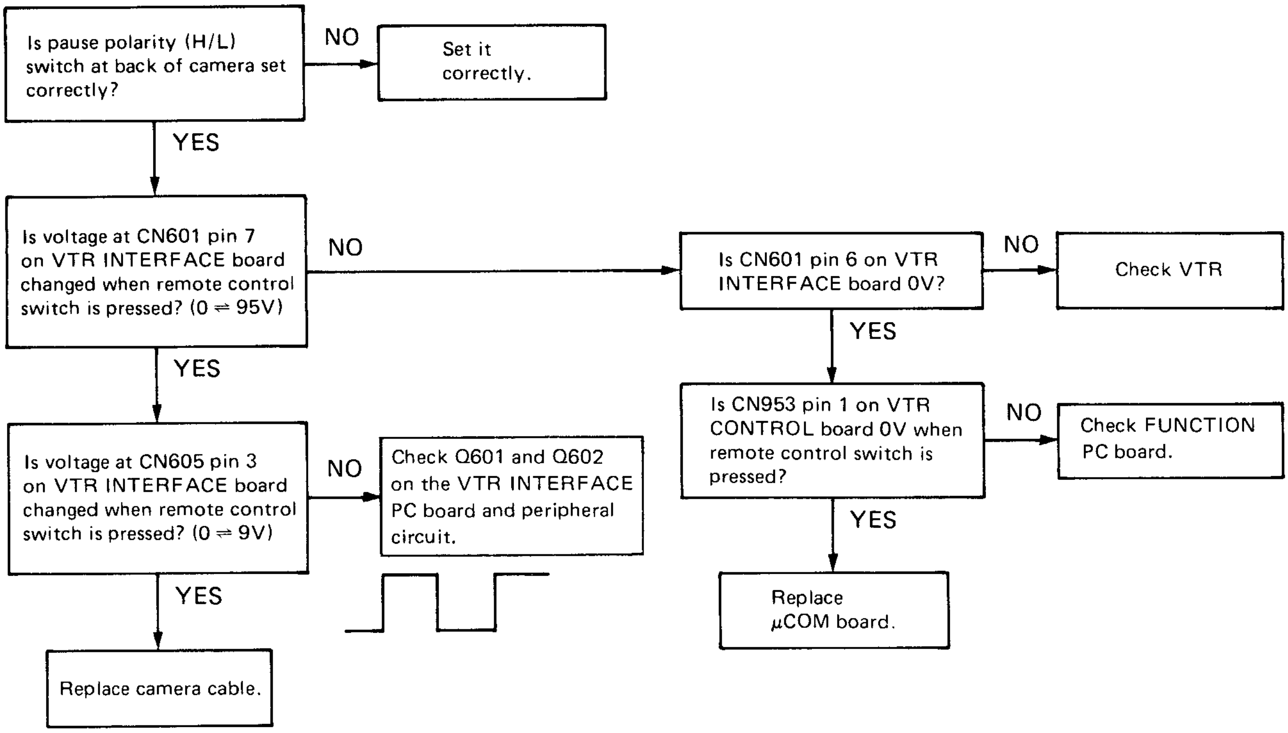
8. Picture smearing

Readjust CV501 (SMEAR) on PREAMP board.
(Refer to Adjustment.)

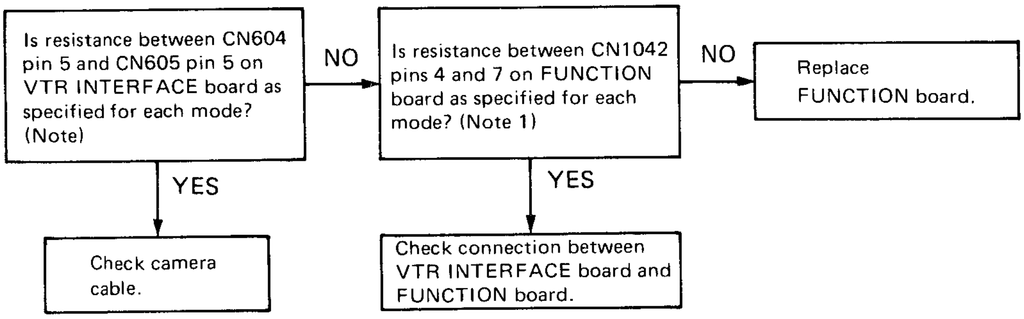
9. Power zoom does not operate


Is connection between DEFLECTION board CN306 and GRIP board correct?
NO
Connect correctly.
YES
Is voltage between CN306 pins 7 and 8 on DEFLECTION board approx. 6V during zoom switch operation?
NO
Check wiring of zoom switch inside grip.
YES
Replace lens.

10. Trigger button of camera does not operate normally with VTR set to record mode


Is pause polarity (H/L) switch at back of camera set correctly?
NO
Set it correctly.
YES
Is voltage at CN601 pin 7 on VTR INTERFACE board changed when remote control switch is pressed? (0 ⇌ 95V)
NO
Is CN601 pin 6 on VTR INTERFACE board 0V?
NO
Check VTR
YES
Is CN953 pin 1 on VTR CONTROL board 0V when remote control switch is pressed?
NO
Check FUNCTION PC board.
YES
Replace μCOM board.
YES
Is voltage at CN605 pin 3 on VTR INTERFACE board changed when remote control switch is pressed? (0 ⇌ 9V)
NO
Check Q601 and Q602 on the VTR INTERFACE PC board and peripheral circuit.
YES
Replace camera cable.

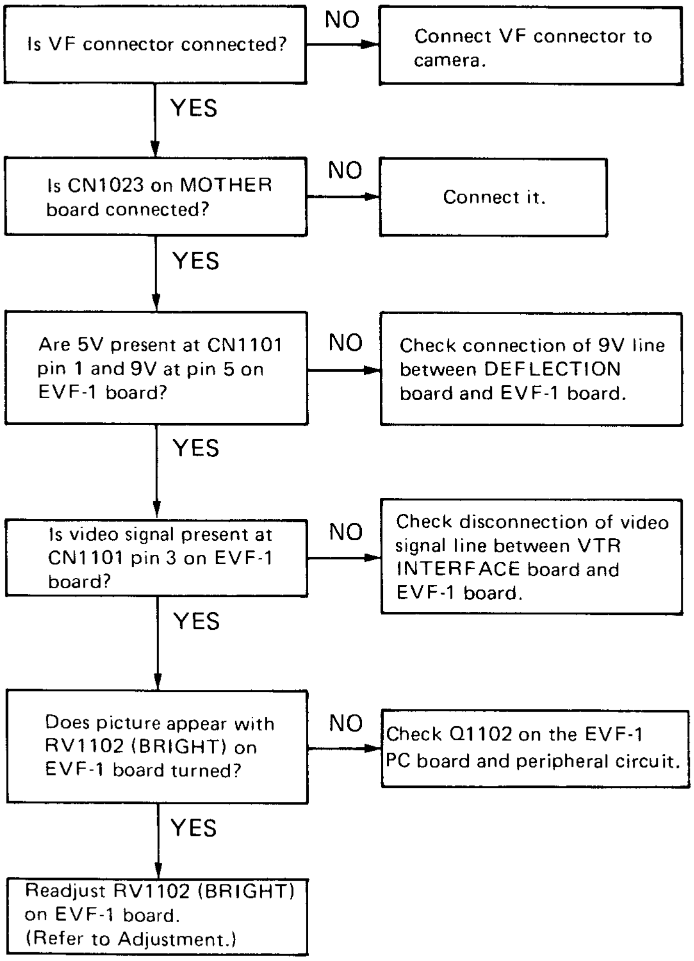
11. Remote control does not operate properly when combined with remote control VTR


Is resistance between CN604 pin 5 and CN605 pin 5 on VTR INTERFACE board as specified for each mode? (Note)
NO
Is resistance between CN1042 pins 4 and 7 on FUNCTION board as specified for each mode? (Note 1)
NO
Replace FUNCTION board.
YES
Check camera cable.
YES
Check connection between VTR INTERFACE board and FUNCTION board.

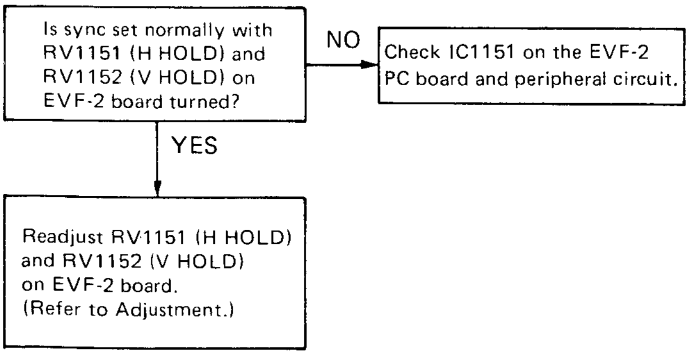
Note) Specified value in each VTR remote control mode

Mode	STILL	REVIEW	REV VISUAL SEARCH	FWD VISUAL SEARCH	SLOW	RESET	PLAY
Resistance (Ω)	0	660	6430	8530	15430	51430	111430

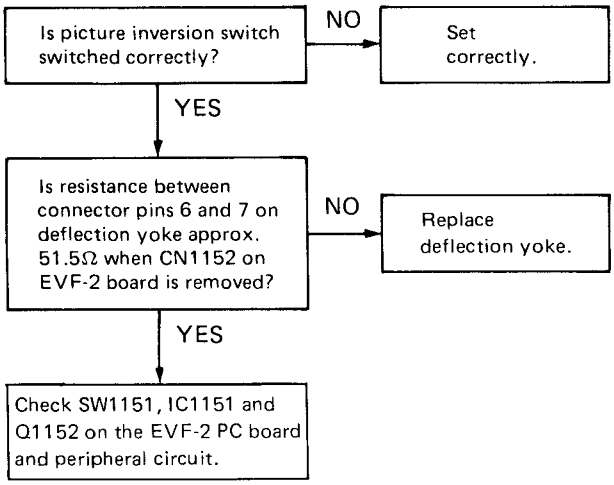
12. No picture in electronic viewfinder


Is VF connector connected?
NO
Connect VF connector to camera.
YES
Is CN1023 on MOTHER board connected?
NO
Connect it.
YES
Are 5V present at CN1101 pin 1 and 9V at pin 5 on EVF-1 board?
NO
Check connection of 9V line between DEFLECTION board and EVF-1 board.
YES
Is video signal present at CN1101 pin 3 on EVF-1 board?
NO
Check disconnection of video signal line between VTR INTERFACE board and EVF-1 board.
YES
Does picture appear with RV1102 (BRIGHT) on EVF-1 board turned?
NO
Check Q1102 on the EVF-1 PC board and peripheral circuit.
YES
Readjust RV1102 (BRIGHT) on EVF-1 board. (Refer to Adjustment.)

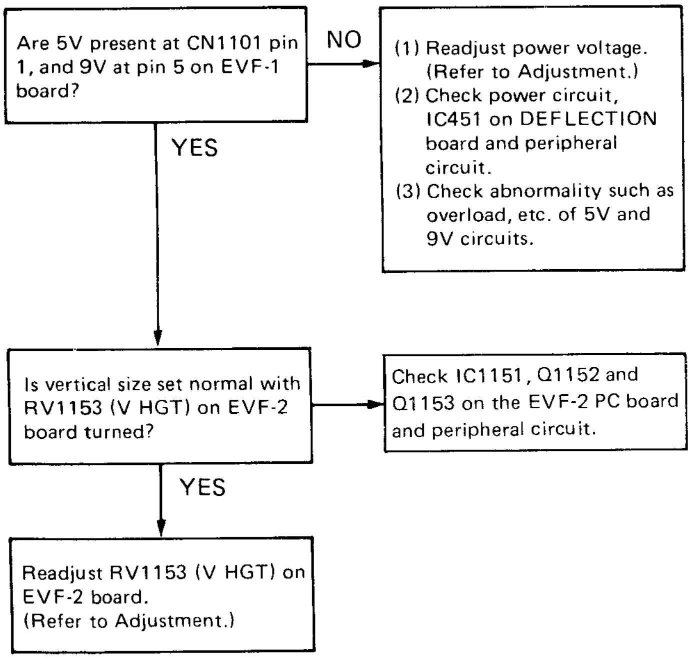
13. Electronic viewfinder sync distortion


Is sync set normally with RV1151 (H HOLD) and RV1152 (V HOLD) on EVF-2 board turned?
NO
Check IC1151 on the EVF-2 PC board and peripheral circuit.
YES
Readjust RV1151 (H HOLD) and RV1152 (V HOLD) on EVF-2 board. (Refer to Adjustment.)

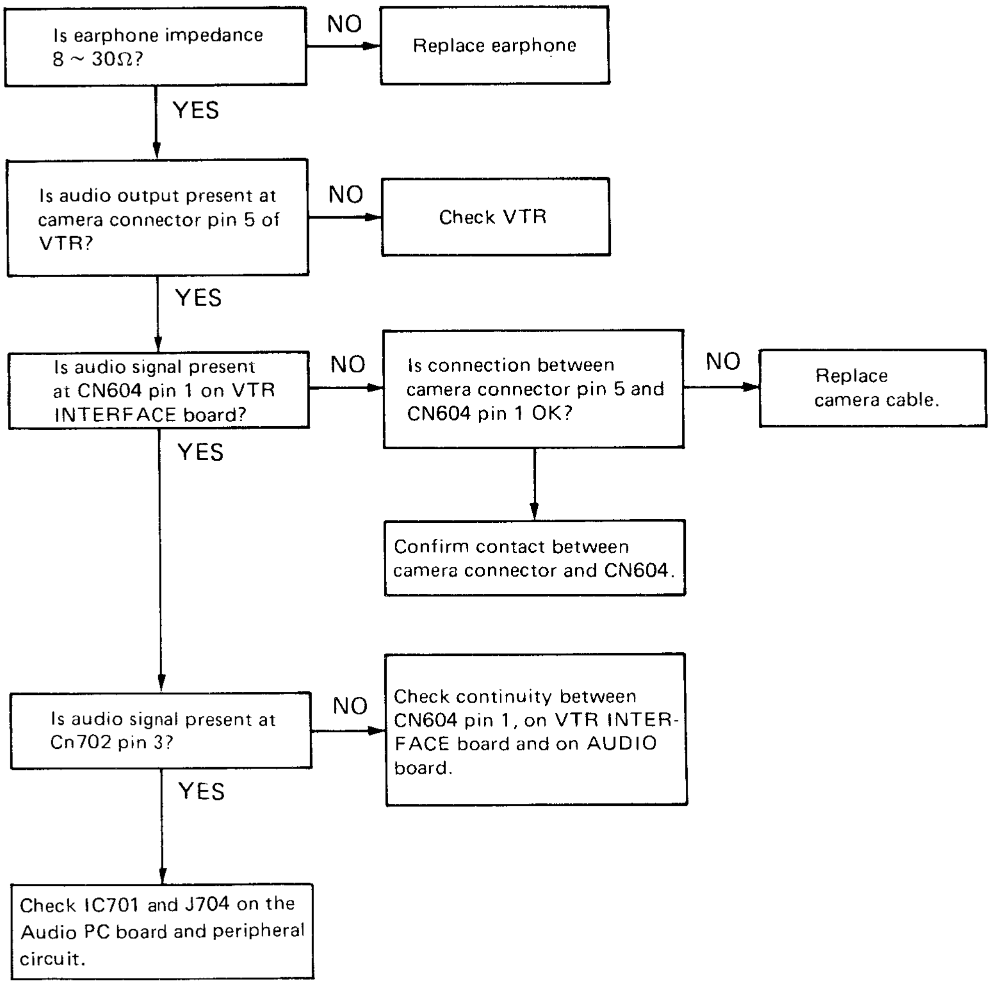
14. Picture in electronic viewfinder becomes a single lateral line


Is picture inversion switch switched correctly?
NO
Set correctly.
YES
Is resistance between connector pins 6 and 7 on deflection yoke approx. 51.5Ω when CN1152 on EVF-2 board is removed?
NO
Replace deflection yoke.
YES
Check SW1151, IC1151 and Q1152 on the EVF-2 PC board and peripheral circuit.

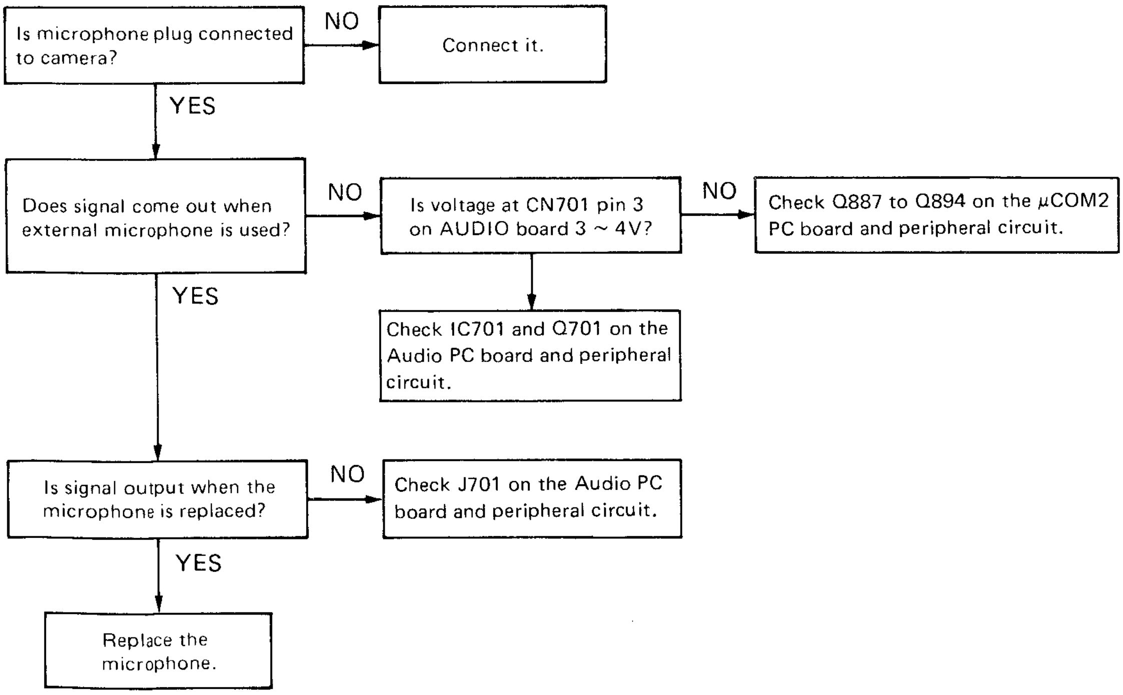
15. Vertical size of picture in electronic viewfinder shrinks


Are 5V present at CN1101 pin 1, and 9V at pin 5 on EVF-1 board?
NO
(1) Readjust power voltage. (Refer to Adjustment.)
(2) Check power circuit, IC451 on DEFLECTION board and peripheral circuit.
(3) Check abnormality such as overload, etc. of 5V and 9V circuits.
YES
Is vertical size set normal with RV1153 (V HGT) on EVF-2 board turned?
Check IC1151, Q1152 and Q1153 on the EVF-2 PC board and peripheral circuit.
YES
Readjust RV1153 (V HGT) on EVF-2 board. (Refer to Adjustment.)

16. Audio monitoring is not possible via earphone jack on camera

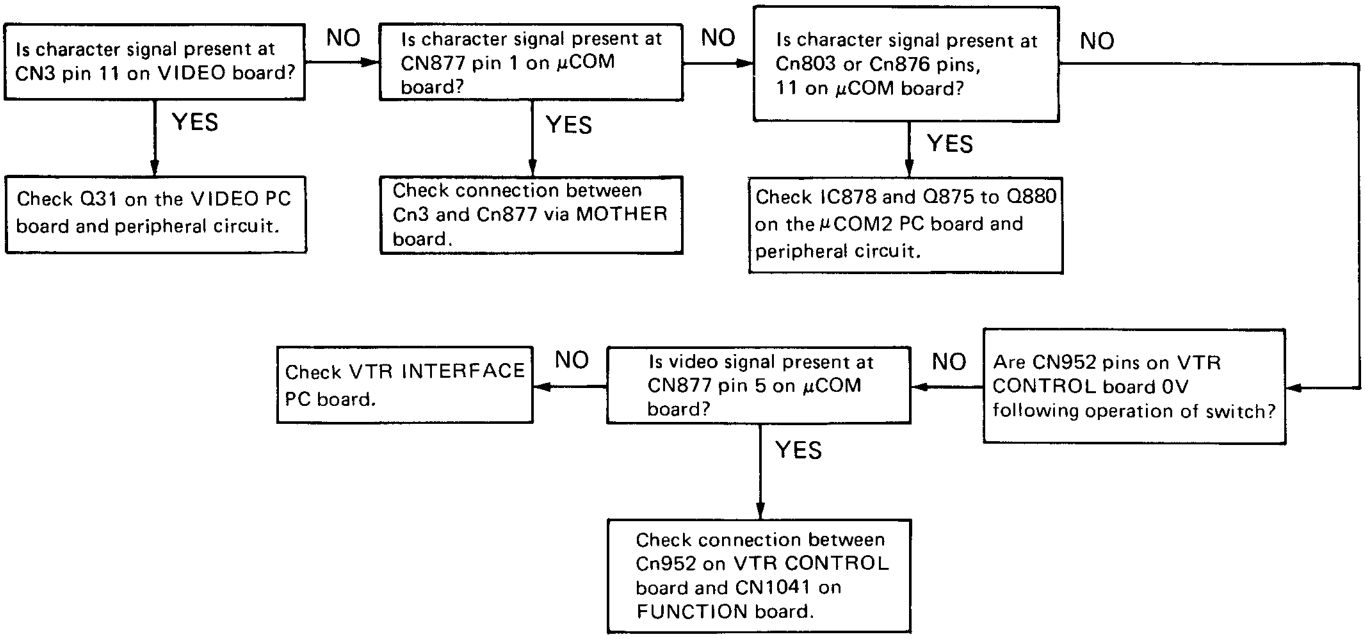

Is earphone impedance 8 ~ 30Ω?
NO
Replace earphone
YES
Is audio output present at camera connector pin 5 of VTR?
NO
Check VTR
YES
Is audio signal present at CN604 pin 1 on VTR INTERFACE board?
NO
Is connection between camera connector pin 5 and CN604 pin 1 OK?
NO
Replace camera cable.
Confirm contact between camera connector and CN604.
YES
Is audio signal present at Cn702 pin 3?
NO
Check continuity between CN604 pin 1, on VTR INTERFACE board and on AUDIO board.
YES
Check IC701 and J704 on the Audio PC board and peripheral circuit.

17. No sound


Is microphone plug connected to camera?
NO
Connect it.
YES
Does signal come out when external microphone is used?
NO
Is voltage at CN701 pin 3 on AUDIO board 3 ~ 4V?
NO
Check Q887 to Q894 on the μCOM2 PC board and peripheral circuit.
Check IC701 and Q701 on the Audio PC board and peripheral circuit.
YES
Is signal output when the microphone is replaced?
NO
Check J701 on the Audio PC board and peripheral circuit.
YES
Replace the microphone.

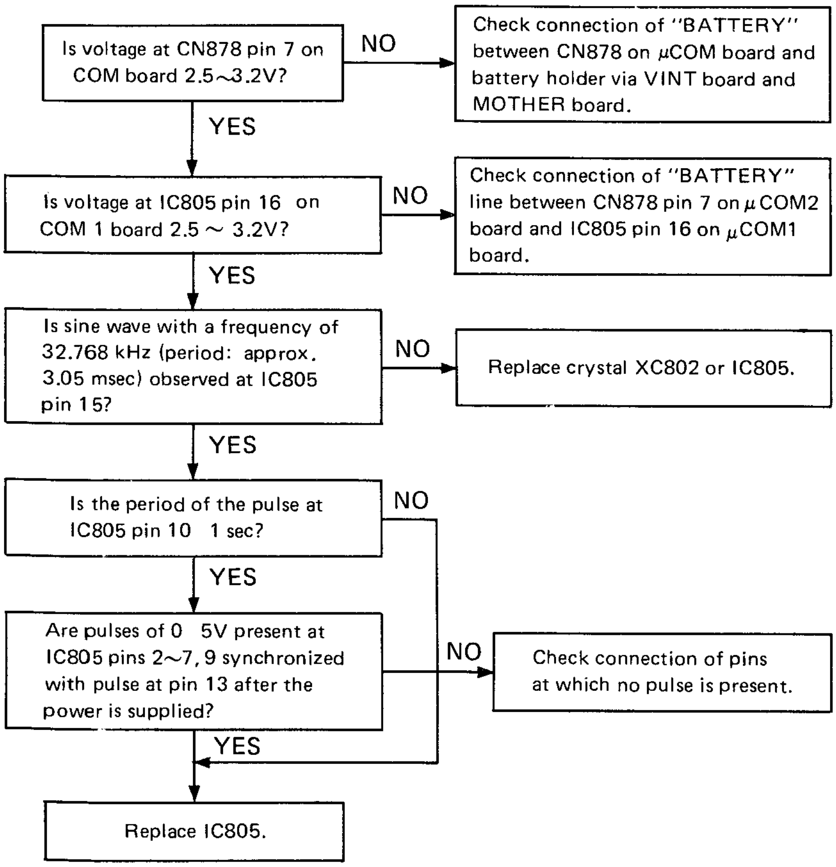
18. Character display defective

18-1. No character signal in video output


Is character signal present at CN3 pin 11 on VIDEO board?
NO
Is character signal present at CN877 pin 1 on μCOM board?
NO
Is character signal present at Cn803 or Cn876 pins, 11 on μCOM board?
NO
YES
Check Q31 on the VIDEO PC board and peripheral circuit.
YES
Check connection between Cn3 and Cn877 via MOTHER board.
YES
Check IC878 and Q875 to Q880 on the μCOM2 PC board and peripheral circuit.
Check VTR INTERFACE PC board.
NO
Is video signal present at CN877 pin 5 on μCOM board?
NO
Are CN952 pins on VTR CONTROL board 0V following operation of switch?
YES
Check connection between Cn952 on VTR CONTROL board and CN1041 on FUNCTION board.

18-2. Clock function does not work

* Confirm voltage of unassembled battery before checking.
(When it is 1.2 to 1.6V for each battery, it is normal)


Is voltage at CN878 pin 7 on COM board 2.5~3.2V?
NO
Check connection of "BATTERY" between CN878 on μCOM board and battery holder via VINT board and MOTHER board.
YES
Is voltage at IC805 pin 16 on COM 1 board 2.5 ~ 3.2V?
NO
Check connection of "BATTERY" line between CN878 pin 7 on μCOM2 board and IC805 pin 16 on μCOM1 board.
YES
Is sine wave with a frequency of 32.768 kHz (period: approx. 3.05 msec) observed at IC805 pin 15?
NO
Replace crystal XC802 or IC805.
YES
Is the period of the pulse at IC805 pin 10 1 sec?
NO
YES
Are pulses of 0 5V present at IC805 pins 2~7, 9 synchronized with pulse at pin 13 after the power is supplied?
NO
Check connection of pins at which no pulse is present.
YES
Replace IC805.

ADJUSTMENT

CONTENTS

ADJUSTING PARTS ABBREVIATION LIST .. 26

BEFORE STARTING ADJUSTMENT 27

ADJUSTMENTS

1. Adjustment camera tube/coil ass'y

1. Beam voltage adjustment 27
2. Back-focus adjustment 28
3. Horizontal size/linearity/centering adjustment ... 28
4. Vertical size/centering adjustment 29
5. Bias light adjustment 29
6. Pulse canceller adjustment 30
7. Dark shading adjustment 30
8. Y setup adjustment 30
9. Edge balance adjustment 30
10. Video level adjustment 31
11. Field focus adjustment 31
12. Chroma carrier level adjustment 32
13. Color separation adjustment 32
14. Black balance adjustment 32
15. White balance adjustment 33
16. Dynamic focus adjustment 33
17. Red/modulation shading adjustment 33
18. Blue/modulation shading adjustment 34
19. White balance readjustment 34
20. De-γ (Degamma) adjustment 35
21. Chroma gain, burst level adjustment 35
22. Red phase adjustment 35
23. Smear adjustment 35

2. Adjustment video circuit board

1. Sub-carrier frequency adjustment 36

3. Pulse canceller adjustment 36
4. Dark shading adjustment 36
5. Y setup adjustment 36
6. Edge balance adjustment 36
7. Video level adjustment 37
8. Chroma carrier level adjustment 37
9. Color separation adjustment 37
10. Black balance adjustment 38
11. White balance adjustment 38
12. De-γ (Degamma) adjustment 38
13. Vertical false signal elimination adjustment 39
14. Chroma gain, burst level adjustment 39
15. Red phase adjustment 39
16. Auto white preset adjustment 39
17. Chroma killer adjustment 39
18. Negative video color phase adjustment 40
19. Low light warning indicator level adjustment 40

3. Adjustment after replacing deflection circuit board

1. Power voltage adjustment 40
2. Beam voltage adjustment 40
3. Horizontal size/linearity/centering adjustment ... 41
4. Vertical size/centering adjustment 41
5. Bias light adjustment 42
6. Pulse canceller adjustment 42
7. Dark shading adjustment 43
8. Video level adjustment 43
9. Fild focus adjustment 43
10. Chroma carrier level adjustment 44
11. Color separation adjustment 44
12. Black balance adjustment 44
13. White balance adjustment 45
14. Dynamic focus adjustment 45
15. Red/modulation shading adjustment 46
16. Blue/modulation shading adjustment 46
17. White balance readjustment 47
18. De-γ (Degamma) adjustment 47
19. Chroma gain, burst level adjustment 47
20. Red phase adjustment 47
21. Auto white present adjustment 47
22. Low light warning indicator level adjustment 48

4. Adjustment viewfinder circuit board

1. Pulse canceller adjustment 48
2. Smear adjustment 48

5. Faulty shading adjustment

1. Dark shading adjustment 49
2. Field focus adjustment 49
3. Black balance adjustment 49
4. White balance adjustment 50
5. Dynamic focus adjustment 50
6. Red/modulation shading adjustment 51
7. Blue/modulation shading adjustment 51
8. White balance readjustment 52
9. De-γ (Degamma) adjustment 52

6. Adjustment viewfinder circuit board

1. Horizontal hold adjustment 53
2. Vertical hold adjustment 53
3. Centering adjustment 53
4. Horizontal size adjustment 53
5. Vertical size adjustment 53
6. Brightness adjustment 53
7. Contrast adjustment 53
8. Focus adjustment 53

7. Auto focus adjustment

1. Focus adjustment 53

ADJUSTMENT LIST

1. Adjustment after replacing camera tube/coil ass'y 54
2. Adjustment after replacing video circuit board ... 64
3. Adjustment after replacing deflection circuit board 70
4. Adjustment after replacing preamplifier circuit board 79
5. Faulty shading adjustment 80

ADJUSTING PARTS ABBREVIATION LIST

Circuit No.	Abbreviation	Description	Circuit board
RV1	YPC	Y pulse cancel	Video
RV2	AGC	AGC gain set	Video
RV3	CCL	Chroma carrier level	Video
RV4	BST	Burst level	Video
RV5	GREF	Degamma reference	Video
RV6	YSET	Y setup	Video
RV7	CPS	Carrier phase	Video
RV8	CBAL	Carrier balance	Video
RV10	RG3	Red degamma 3	Video
RV11	RG2	Red degamma 2	Video
RV12	RG1	Red degamma 1	Video
RV13	RGN	Red gain	Video
RV14	BG3	Blue degamma 3	Video
RV15	BG2	Blue degamma 2	Video
RV16	BG1	Blue degamma 1	Video
RV17	BGN	Blue gain	Video
RV20	NP	Negative video, color phase	Video
RV21	PP	Positive video, color phase	Video
RV22	BSET	Blue setup	Video
RV23	RSET	Red setup	Video
RV24	R-Y GN	R-Y gain	Video
RV25	CKL	Chroma killer level	Video
RV26	CGN	Chroma gain	Video
RV27	DBIAS	Delay IC bias	Video
RV28	VEG	Vertical edge gain	Video
RV29	VEB	Vertical edge balance	Video
RV30	CBC	Chroma black clip	Video
CV1	SCB	B-Y sub-carrier phase	Video
RV201	RWS	Red white set	Auto white
RV202	BWS	Blue white set	Auto white
CV251	FSC	Sub-carrier frequency	SSG
RV301	FOC	Focus	Deflection
RV302	BEAM	Beam	Deflection
RV303	HLN	Horizontal	Deflection
RV304	HCT	Horizontal centering	Deflection
RV305	HGT	Height linearity	Deflection
RV306	VCT	Vertical centering	Deflection
RV323	LIS	Level indicator set	Deflection
RV324	AVL	Auto iris video level	Deflection
RV325	BL	Bias light	Deflection
RV326	ABO	Automatic beam optimizer	Deflection
RV451	9V	9V	Deflection
RV452	5V	5V	Deflection
RV453	M5V	Microprocessor 5V	Deflection
RV454	D5V	Direct 5V	Deflection
LV301	WID	Width	Deflection
RVM1-1	DHS	Dynamic focus horizontal sawtooth	Deflection
RVM1-2	DHP	Dynamic focus horizontal parabola	Deflection
RVM1-3	DVS	Dynamic focus vertical sawtooth	Deflection
RVM1-4	DVP	Dynamic focus vertical parabola	Deflection
RVM2-1	DKHS	Dark horizontal sawtooth	Deflection
RVM2-2	DKHP	Dark horizontal parabola	Deflection
RVM2-3	DKVS	Dark vertical sawtooth	Deflection
RVM2-4	DKVP	Dark vertical parabola	Deflection
RVM3-1	RHS	Red shading horizontal sawtooth	Deflection
RVM3-2	RHP	Red shading horizontal parabola	Deflection
RVM3-3	RVS	Red shading vertical sawtooth	Deflection
RVM3-4	RVP	Red shading vertical parabola	Deflection
RVM4-1	BHS	Blue shading horizontal sawtooth	Deflection
RVM4-2	BHP	Blue shading horizontal parabola	Deflection
RVM4-3	BVS	Blue shading vertical sawtooth	Deflection
RVM4-4	BVP	Blue shading vertical parabola	Deflection
CV501	SMP	Smear	Preamp
RV801	COSC	Character frequency	μCOM 1
CV801	SOSC	Stop watch frequency	μCOM 1
CV802	CLOSC	Clock frequency	μ COM1
RV1101	CONTR	Contrast	Viewfinder 1
RV1102	BRIGHT	Brightness	Viewfinder 1
RV1103	VFOC	VF focus	Viewfinder 1
LV1101	VWID	VF width	Viewfinder 1
RV1151	HHOLD	Horizontal hold	Viewfinder 2
RV1152	VHOLD	Vertical hold	Viewfinder 2
RV1153	VHCT	VF height	Viewfinder 2

BEFORE STARTING ADJUSTMENT

Check the following before starting adjustment.

1. Connection

Connection between the camera, power supply and TV set. etc.

2. Measuring instruments and tools, etc., used for adjustment.

- Measuring instruments
  Oscilloscope, frequency counter, DC voltmeter
- Tools, etc.
  (+) screwdriver (medium), (−) screwdriver (small), adjusting screwdriver, soldering iron, color viewer (3100°), test chart A, gray scale chart, color bar chart, resistors 4.7 kΩ ~ 10 kΩ (1/8 ~ 1/2W), tripod, monitor TV set.

3. Preparation

- Set distance between the camera lens and color viewer to 1.5 to 2 m.

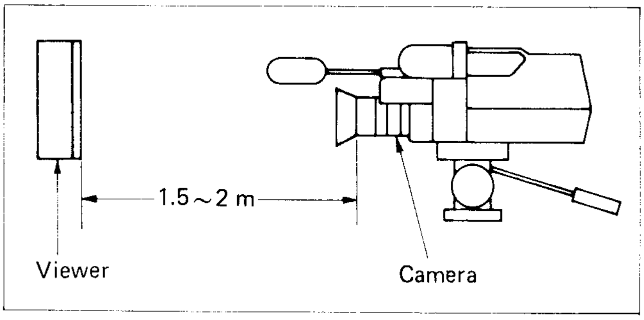


Fig. 1

- Camera operation switch positions

Power save switch:	Set to PWR SAVE during preparation (NORM during adjustment)
Iris control:	Click position
Indoor/outdoor switch	Indoor position
Neg/norm switch	Norm position
White balance control:	Click position

- Use CN002 (video board) or CN301 (deflection board) when applying external sync.
  V period: CN002 ..... Pin 3 or CN301 ..... Pin 14
  H period: CN002 ..... Pin 2 or CN301 ..... Pin 15
- GND-video board: TP019 or deflection board: TP301
- Video signal output: Video board TP3
- Set the power save switch of the camera to NORM and then set the switch of the color viewer to ON when starting adjustment. Be sure to observe this procedure, if it is done in reverse, the SATICON tube may be burnt.
- Shoot the chart for the full video period when otherwise not specified.
- Set the time axis of the oscilloscope to the H period (horizontal period) in general. Switch over to the V period when specified.
- "White chart" means "shoot without inserting a chart into the color viewer".
- Set the probe to 10:1 in general.

ADJUSTMENT

1. ADJUSTMENT CAMERA TUBE/COIL ASS'Y

1. Beam voltage adjustment

RV302, 326: Deflection board
(RV301, 303, 304, 305, 306, LV301: Deflection board)
TP3, TP1: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the test chart A.
3) Turn RV302 clockwise to make the picture appear when the picture does not appear on the TV screen.
4) Bring the picture into focus while observing the TV screen.
   Adjust RV301 to bring the picture into focus.
   * Item 5 is not required when the circle of the chart appears round while observing the TV screen.
5) When the circle of the chart is not round on the TV screen, adjust the control VRs shown below so that it is made round and the size roughly matches.
   RV303: Horizontal linearity
   RV304: Horizontal centering
   LV301: Horizontal size (WIDE)
   RV305: Vertical size (HEIGHT)
   RV306: Vertical centering
6) Connect an oscilloscope to TP1 on the video board.
7) Turn RV326 fully counterclockwise.
8) Shoot the chart as shown in Fig. 2.
   Set the zoom to the same position as that when the test chart A is shot in item 2.

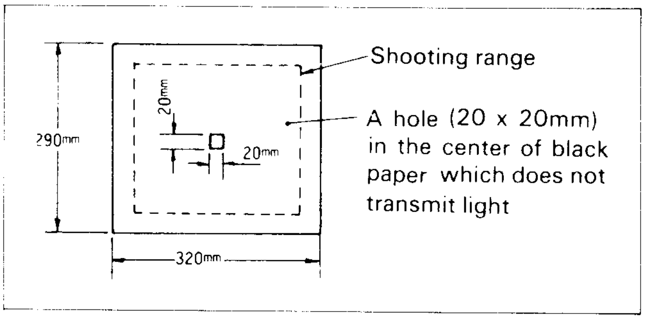

Shooting range
A hole (20 x 20mm) in the center of black paper which does not transmit light
290mm
20mm
20mm
320mm

Fig. 2

9) Adjust RV302 so that the click level of the beam is 1.5 Vp-p ± 0.05V.
10) Adjust RV326 so that the click level of the beam is 2.4 Vp-p ± 0.1V.

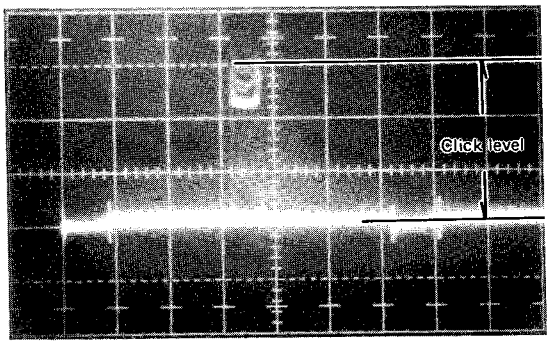
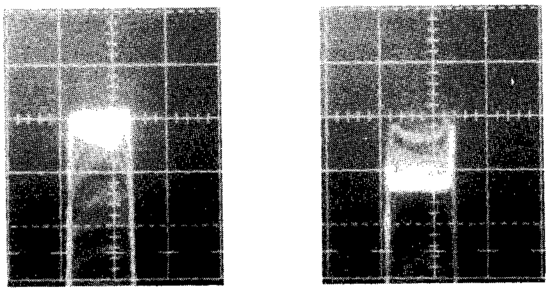


Fig. 3

When the camera is aimed at the chart and the waveform becomes as in Fig. 4 (a), adjustment cannot be performed correctly, so turn the iris control to increase the incident light and obtain the waveform as in (b).


(a) (b) Fig. 4

2. **Back-focus adjustment**
    1) Set the distance between the color viewer and camera lens surface to 3 m.

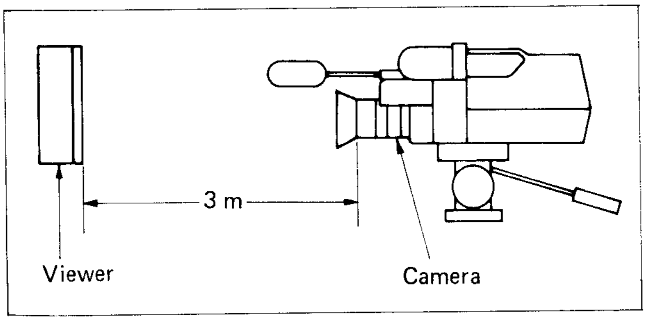


Fig. 5

2) Shoot the test chart A.
3) Adjust zoom to set to TELEPHOTO and focus using the lens focus ring.
4) Next set the lens to WIDE.
5) Loosen the back-focus fixing screw, turn the focus control screw to focus.

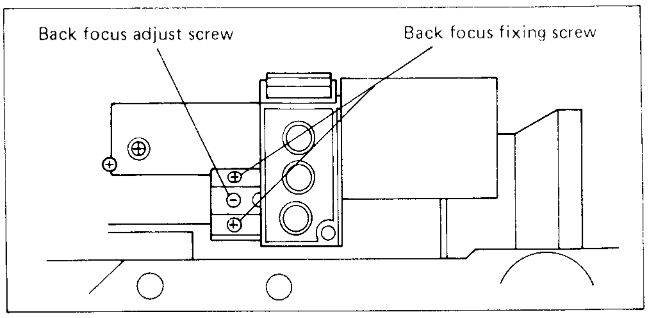


Fig. 6

6) Set the zoom to TELEPHOTO again and focus using the lens focus ring.
7) Repeatedly adjust TELEPHOTO and WIDE so that both are focused. Set the index to match 3 m when TELEPHONO and WIDE are both focused.
8) Check that it is in focus when the index is set to "∞" and a remote object (10 m or more away) is shot.
9) Tighten the back-focus fixing screw.

3. **Horizontal size/linearity/centering adjustment**
    RV303, 304, LV301: Deflection board
    TP3: Video board
    1) Connect an oscilloscope to TP3 on the video board.
    2) Shoot a white chart and set the zoom to TELEPHOTO.
    3) Turn LV301 to shorten the waveform width and make optical black appear a little to the left and right.

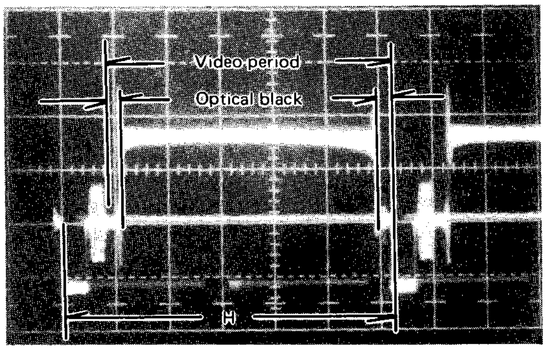
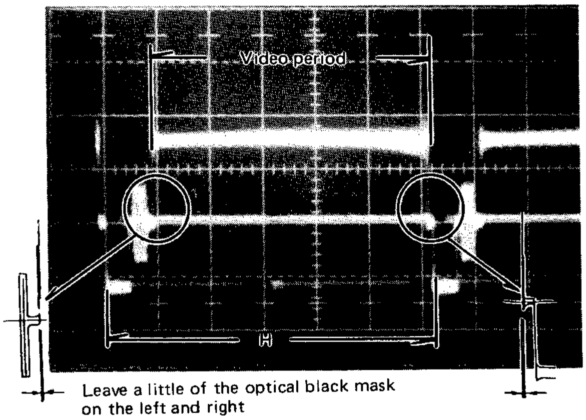


Fig. 7

4) Adjust RV304 so that the left and right optical black is symmetrical.
5) Shoot the test chart A.
6) Adjust RV303 so that the circle on the TV screen is symmetrical to the left and right.
7) Shoot a white chart and set the zoom to TELEPHOTO.
8) Adjust LV301 so that the optical black mask remains a little on the left and right. Fine adjust RV304 at this time so that the optical black mask is symmetrical on the left and right.



Leave a little of the optical black mask on the left and right

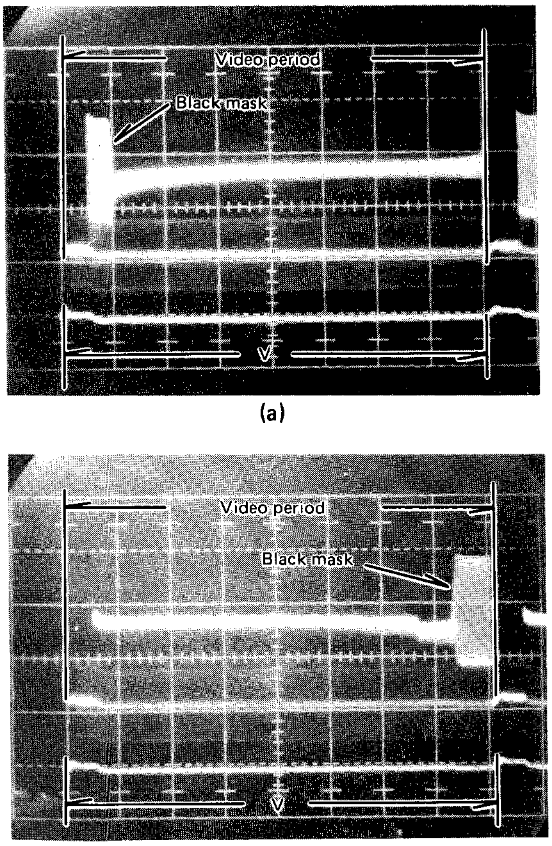
Fig. 8

Note 1: When the above adjustment is not performed properly, best and shading may occur.

4. Vertical size/centering adjustment

RV305, 306: Deflection board
TP3, TP1: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Set the oscilloscope to the V period.
4) Turn RV305 to shorten the wave width and make black mask appear a little on the left and right.
   * The black mask is seen as a green horizontal bar on the TV screen.



(a)

(b)

Fig. 9

5) Adjust RV306 so that the black mask is symmetrical on the left and right.
6) Connect the oscilloscope set to the V period to TP1 on the video board.
7) Adjust RV305 so that beats in the waveform are minimum.

*When RV305 is turned, the width increases as beats in the waveform decrease. Adjust finely RV306 so that the black mask is symmetrical on the left and right.

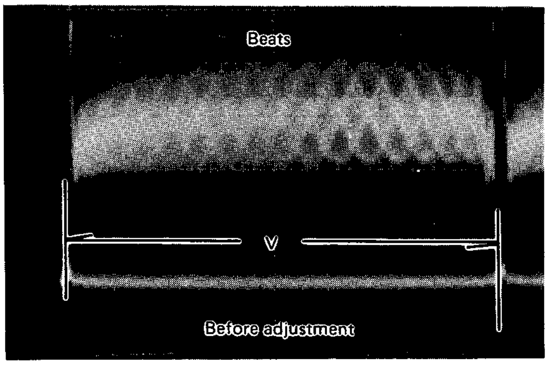


Fig. 10

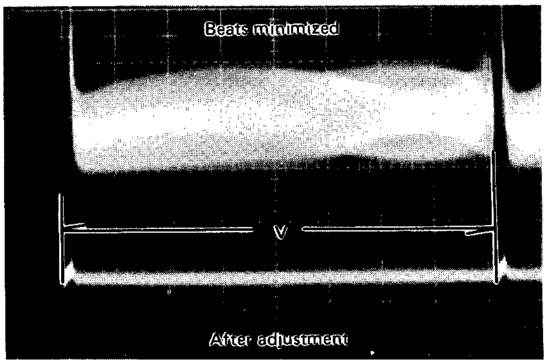


Fig. 11

5. Bias light adjustment

RV325: Deflection board
TP1: Video board

1) Fit the lens cap.
2) Set the probe to 1:1 and connect it to TP1 on the video board via a resistor (4.7 kΩ ~ 10 kΩ).
   * When the probe is held near the tip, noise is picked up.

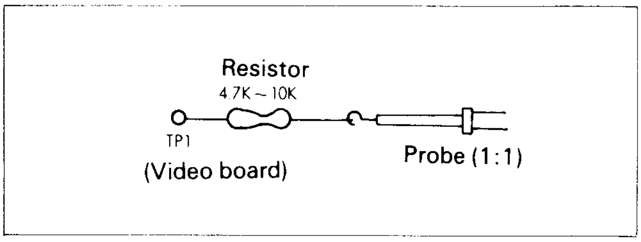


Fig. 12

3) Adjust RV325 so that the level at the waveform center is 20 mVp-p ± 2 mV.

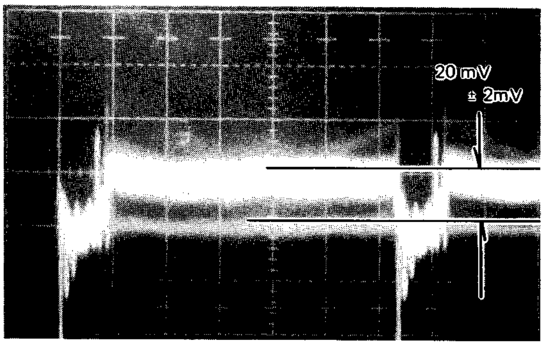


Fig. 13

6. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP2 on the video board.
3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as posible.

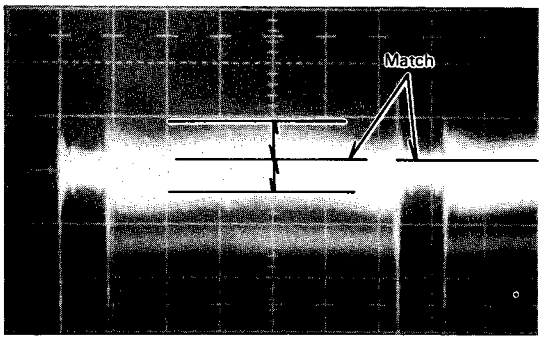
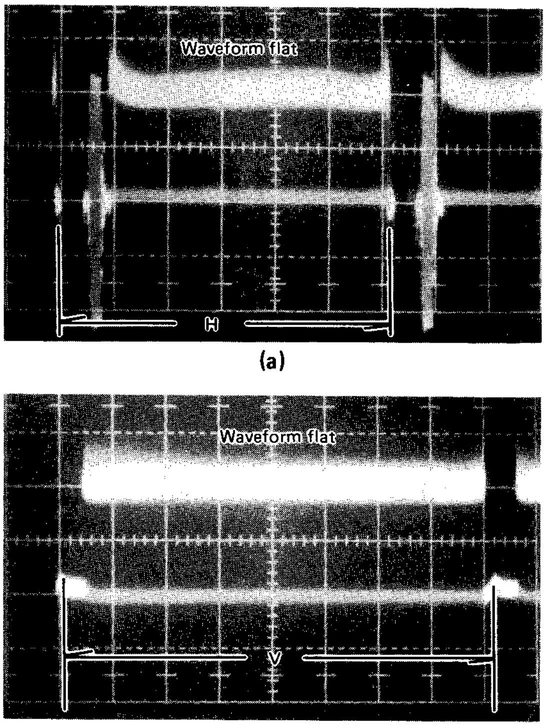


Fig. 14

7. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 on the video board so that the setup level is 30 ~ 60 mVp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 15

8. Y setup adjustment

RV6: Video board
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Adjust RV6 so that the setup level is 30 mVp-p ± 20 mV.

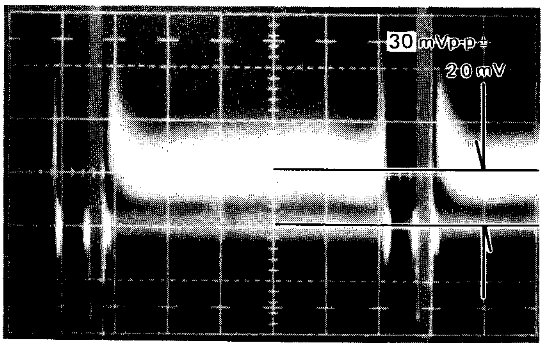


Fig. 16

9. Edge balance adjustment

RV27, 29: Video board
TP17, TP18: Video board

1) Connect an oscilloscope to TP17 on the video board.
2) Shoot a gray scale chart.
3) Adjust RV27 so that the staircase waveform is maximized.

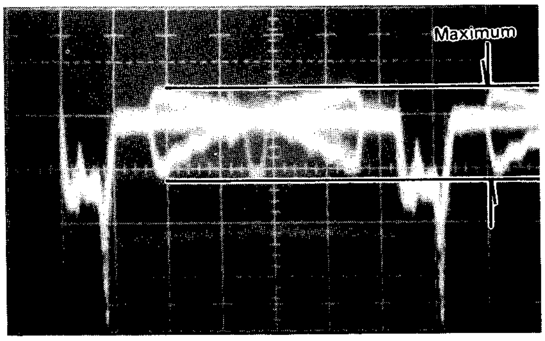


Fig. 17

4) Connect the oscilloscope to TP18 on the video board.
5) Adjust RV29 so that the waveform is minimized.

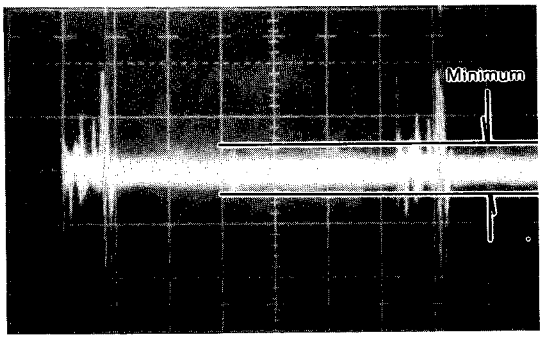


Fig. 18

10. Video level adjustment

RV2: Video board
RV324: Deflection board
TP1, TP3: Video board

1) Set the probe to 1 : 1 and connect it to TP1 on the video board via a resistor (4.7 kΩ~10 kΩ) (See Fig. 12).
2) Shoot the gray scale chart.
3) Adjust RV324 so that the video signal component of the waveform is 600 mVp-p ± 20 mV.

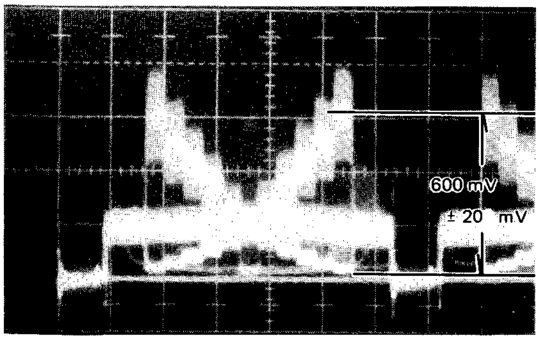


Fig. 19

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05 V.

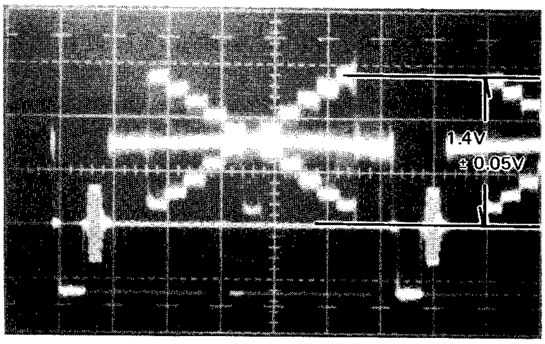


Fig. 20

11. Field focus adjustment

RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP301-305: Deflection board
TP5: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Connect an oscilloscope to TP301 on the deflection board.
3) Preadjust RVM1-1 - RVM1-4 so that the waveform is minimized.
4) Connect an oscilloscope to TP5 on the video board.
5) Shoot a white chart and set the zoom to TELEPHOTO.
6) Adjust RV301 so that the carrier level is max. and the flat range without peaks or troughs is as wide as possible.
   * This is to faciliate shading correction later.

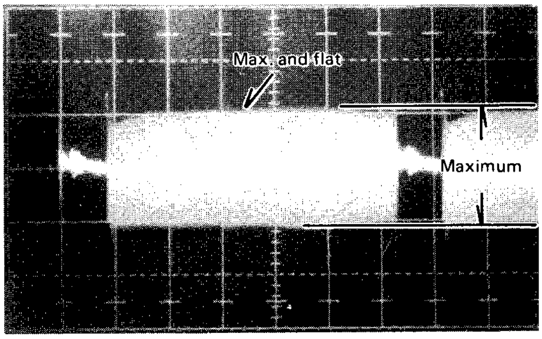


Fig. 21

12. Chroma carrier level adjustment

RV3: Video board
TP5: Video board

1) Connect an oscilloscope to TP5 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV3 so that the waveform level is 150mVp-p ± 20 mV.
   * Use the oscilloscope with the probe set to 1:1. Otherwise, the black portion (1st ~ 4th steps from the bottom) of the waveform is distorted.

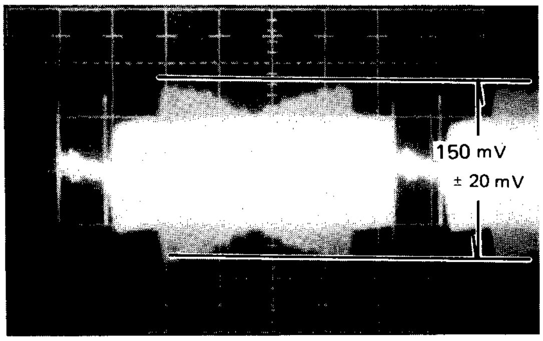


Fig. 22

13. Color separation adjustment

TP7: Video board
RV7, 8: Video board

1) Connect an oscilloscope to TP7 on the video board.
2) Shoot the color bar chart.
3) Alternately adjust RV7 and RV8 to minimize the yellow level of the waveform.

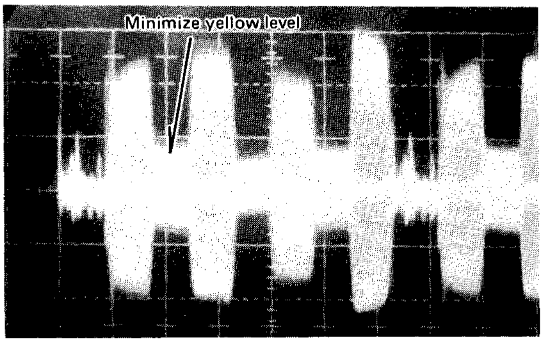


Fig. 23

Note: For easy observation, rotate 17 a little clockwise. After the chroma separation adjustment, set RV17 to the initial position. (Adjust white balance.)

14. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step from the top of the staircase waveform appear.

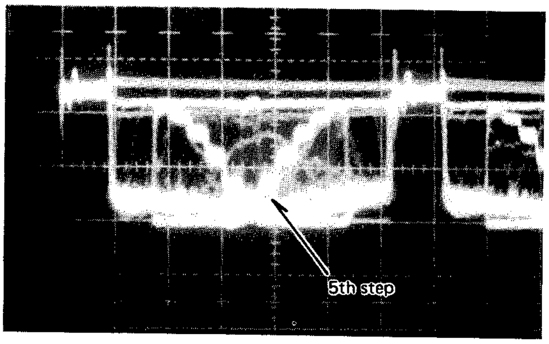


Fig. 24

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust the iris control so that output level becomes minimum (100 mV approx.)
6) Alternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform.
7) Adjust the iris control to the mid-position.

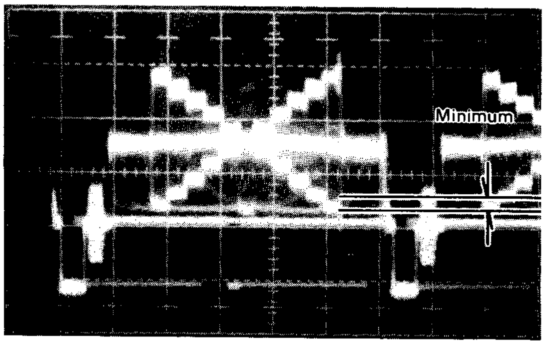


Fig. 25

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.1V ± 0.02 V.

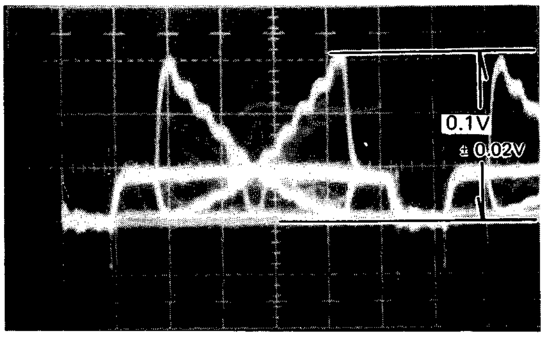


Fig. 26

15. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

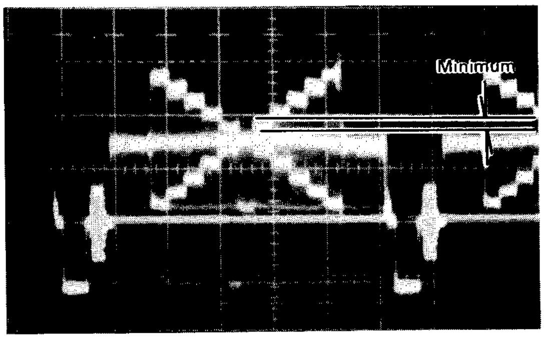
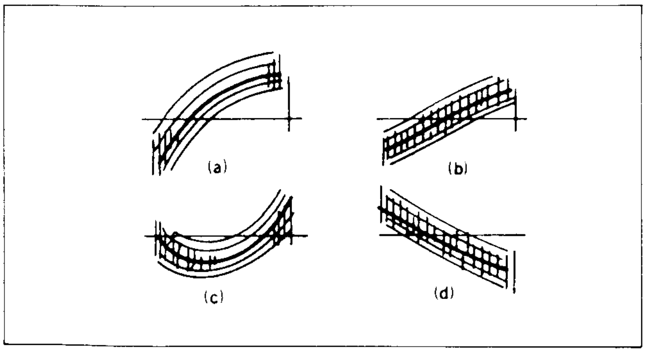


Fig. 27

16. Dynamic focus adjustment

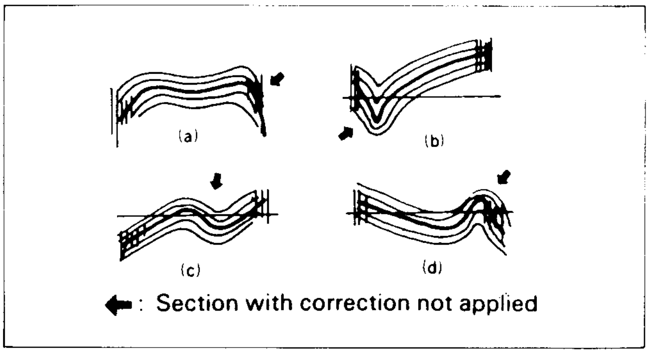
RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP12, TP14: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Connect one channel of an oscilloscope to TP12 (R-YL) on the video board and the other channel to TP14 (B-YL).
4) Set input range of an oscilloscope to 10 mV/div (10:1 probe used) for both channels and set to the DUAL mode.
5) Adjust RVM1-1, RVM1-2 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 28

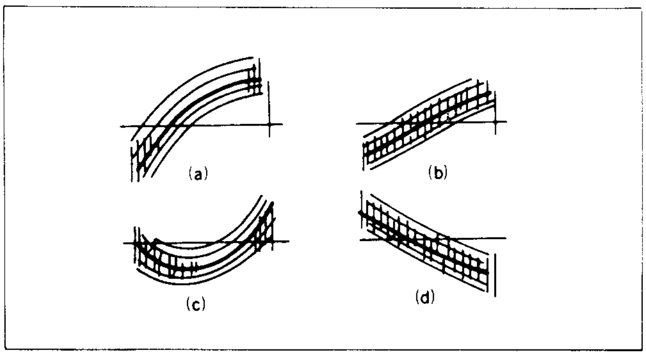


⬅ : Section with correction not applied

Waveform making it difficult to correct shading

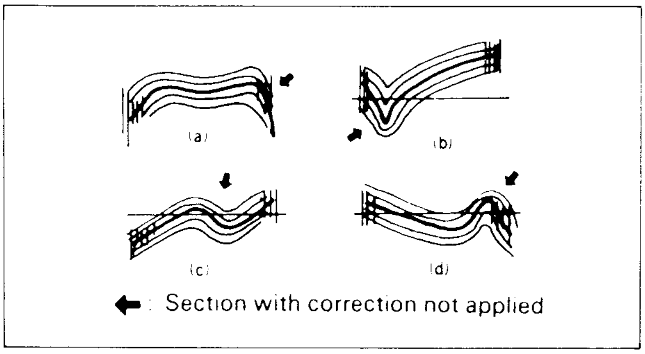
Fig. 29

6) Set an oscilloscope to the V period.
7) Adjust RVM1-3, RV1-4 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 30



⬅ : Section with correction not applied

Waveform making it difficult to correct shading

Fig. 31

8) Remove short-circuit.
9) When the waveform making it easy to apply shading correction cannot be obtained by the above adjustment adjust the field focus in item 11, and then adjust as shown in 7) ~ 9), item 16 again.

17. Red/modulation shading adjustment

RVM3-1, 3-2, 3-3, 3-4: Deflection board
TP12: Video board

1) Shoot the white chart and set the zoom to TELE-PHOTO.
2) Connect an oscilloscope to TP12 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

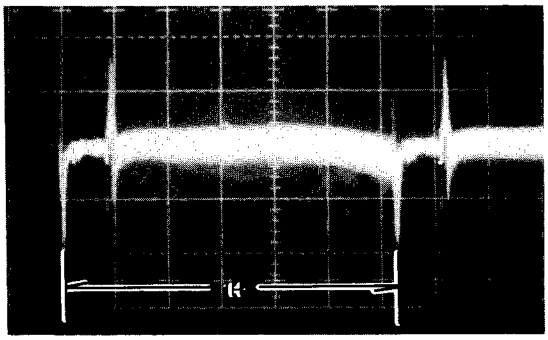


Fig. 32

5) Set an oscilloscope to the V period.
6) Adjust RVM3-3 and RVM3-4 so that the waveform is as flat as possible.

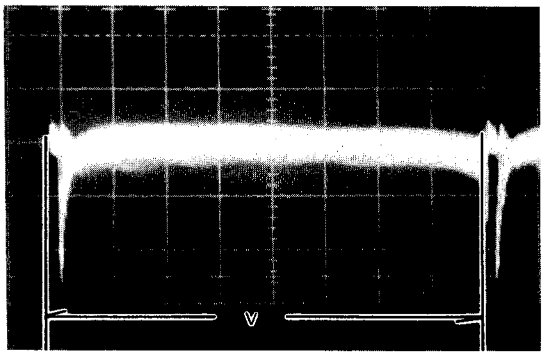


Fig. 33

18. Blue/modulation shading adjustment

RVM4-1, 4-2, 4-3, 4-4: Deflection board
TP14: Video board

1) Shoot the white chart and set the zoom to TELE-PHOTO.
2) Connect an oscilloscope to TP14 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

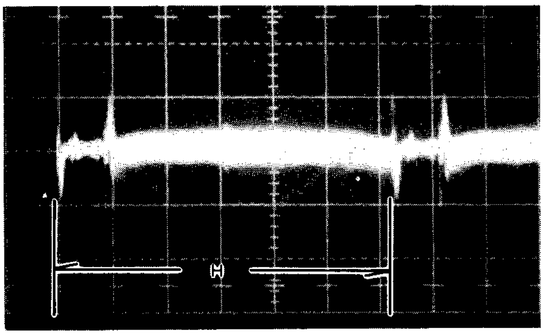


Fig. 34

5) Set an oscilloscope to the V period.
6) Adjust RVM4-3 and RVM4-4 so that the waveform is as flat as possible.

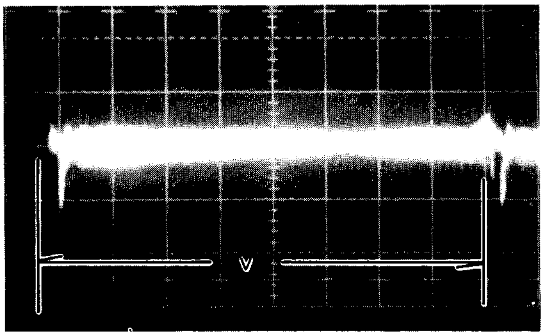


Fig. 35

19. White balance readjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

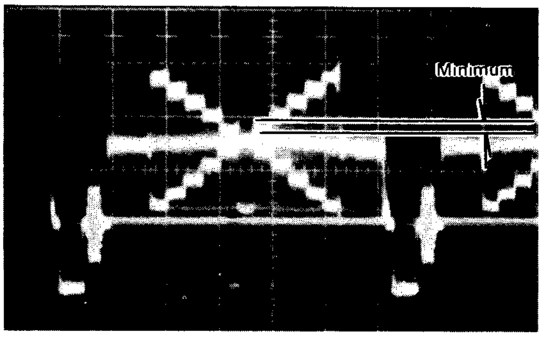


Fig. 36

20. De-γ (Degamma) Adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st – 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th – 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

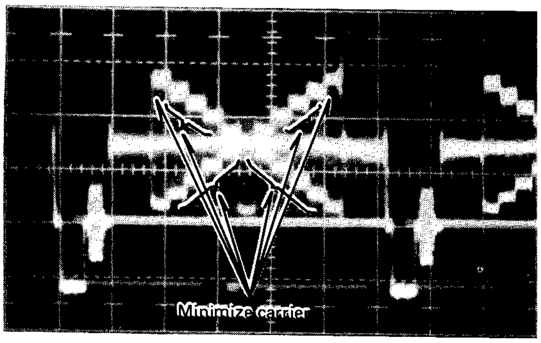


Fig. 37

21. Chroma gain, burst level adjustment

TP3: Video board
RV4, 24, 26: Video board
Iris control: Side of camera

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the color bar chart.
3) Set the white level of the video signal color bar to 1.2 Vp-p using the iris control.
4) Adjust RV24 so that the red carrier level is 0.96Vp-p.
5) Adjust RV26 to set the yellow carrier level of the waveform to 0.48Vp-p ±0.04V.
When red carrier level is not set to 0.96 ±0.04Vp-p after this setting readjust RV24.

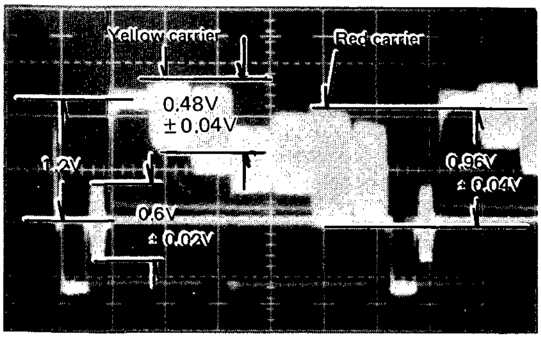


Fig. 38

6) Adjust RV4 to set the burst level to 0.6 Vp-p ± 0.02 V.
7) Return the iris control to its click position.

22. Red phase adjustment

RV21: Video board

1) Shoot the color bar chart.
2) Adjust RV21 so that the tint of the red of both the TV screen and the color bar chart match as much as possible.

23. Smear adjustment

CV501: Preamplifier board

This adjustment is performed only when color smear is present. Readjust Chroma carrier level, Black balance, White balance and De-γ (Degamma) again when smear has been adjusted.

1) Shoot the gray scale chart.
2) Adjust CV501 so that color smear does not occur on the right of the white section of the gray scale on the TV screen.

2. ADJUSTMENT VIDEO CIRCUIT BOARD

1. Sub-carrier frequency adjustment

CV251: Video board
TP16: Video board

1) Connect a frequency counter to TP16 on the video board.
2) Adjust CV251 so that the frequency counter indicates 4,433619 MHz ± 100 Hz.

2. PLL adjustment

LV251: SSG board on the video board.
TP251: SSG board on the video board.

1) Connect a DC voltmeter to TP251 on the SSG board.
2) Adjust LV251 so that the DC voltmeter indicates 3.0V± 0.1V.

3. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TR2 on the video board.
3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as possible.

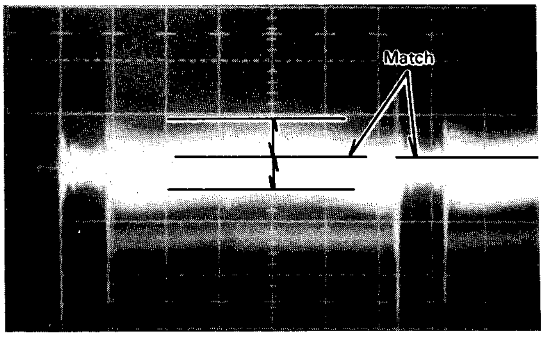
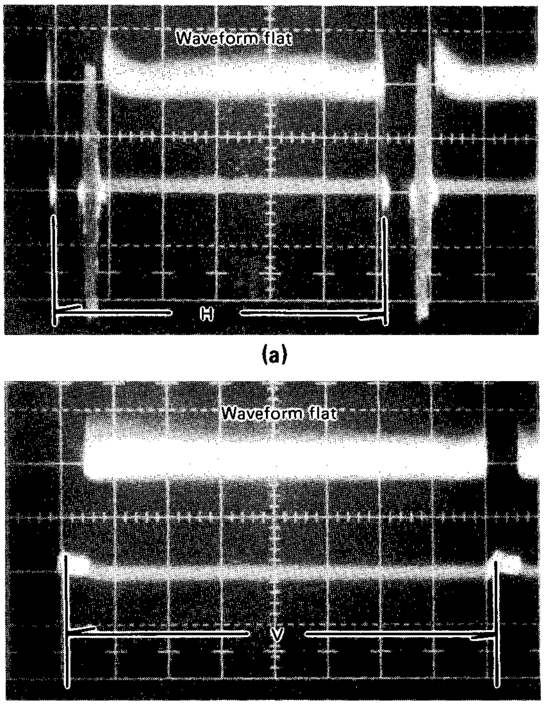


Fig. 41

4. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 so that the setup level is 30 ~60 Vp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 42

5. Y setup adjustment

RV6: Video board
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Adjust RV6 so that the setup level is 30 mVp-p ± 20 mV.

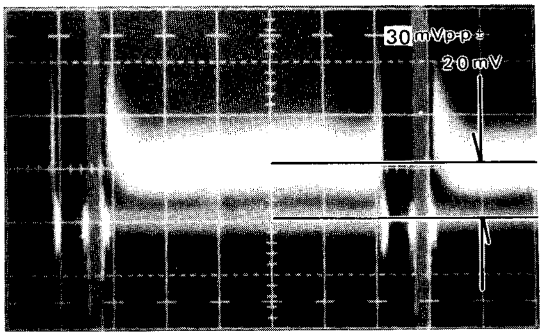


Fig. 43

6. Edge balance adjustment

RV27, 29: Video board
TP17, TP18: Video board

1) Connect an oscilloscope to TP17 on the video board.
2) Shoot a gray scale chart.
3) Adjust RV27 so that the staircase waveform is maximized.

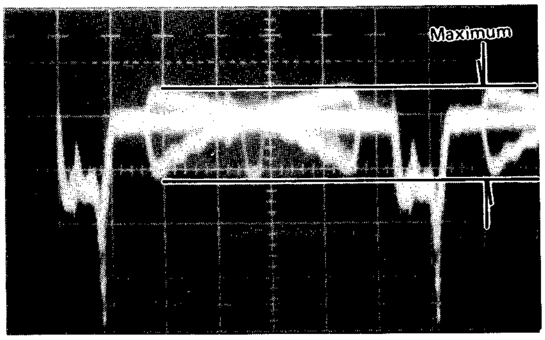


Fig. 44

4) Connect the oscilloscope to TP18 on the video board.
5) Adjust RV29 so that the waveform is minimized.

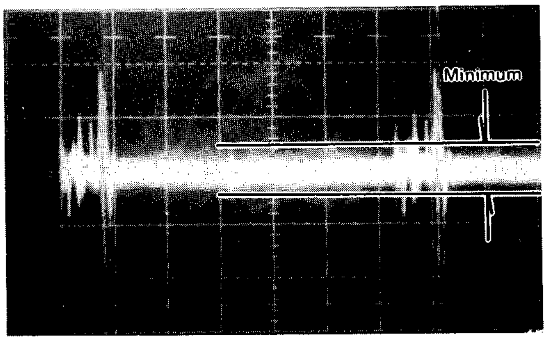


Fig. 45

7. Video level adjustment

RV2: Video board
RV324: Deflection board
TP1, TP3: Video board

1) Set the probe to 1 : 1 and connect it to TP1 on video board via a resistor (4.7 kΩ ~10 kΩ) (See Fig. 12).
2) Shoot the gray scale chart.
3) Adjust RV324 so that the video signal component of the waveform is 600 mVp-p ± 20 mV.

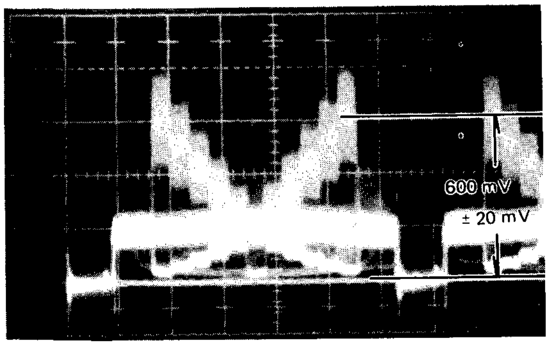


Fig. 46

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05 V.

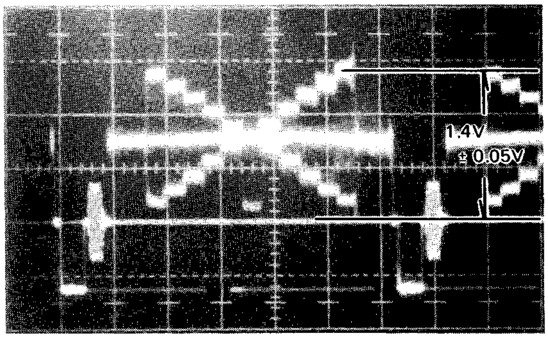


Fig. 47

8. Chroma carrier level adjustment

RV3: Video board
TP5: Video board

1) Connect an oscilloscope to TP5 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV3 so that the waveform level is 150 mVp-p ± 20 mV.
   * Use the oscilloscope with the probe set to 1:1. Otherwise, the black portion (1st ~ 4th steps from the bottom) of the waveform is distorted.

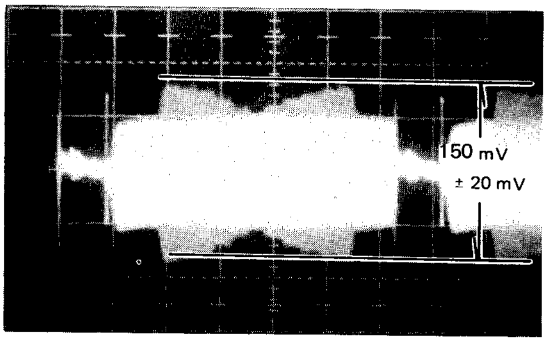


Fig. 48

9. Color separation adjustment

TP7: Video board
RV7, 8: Video board

1) Connect an oscilloscope to TP7 on the video board.
2) Shoot the color bar chart.
3) Alternately adjust RV7 and RV8 to minimize the yellow level of the waveform.

Note: For easy observation, rotate RV17 a little clockwise. After the chroma separation adjustment, set RV17 to the initial position. (Adjust white balance.)

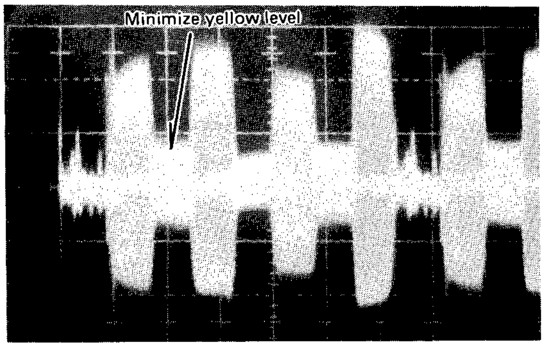


Fig. 49

10. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step from the top of the staircase waveform appear.

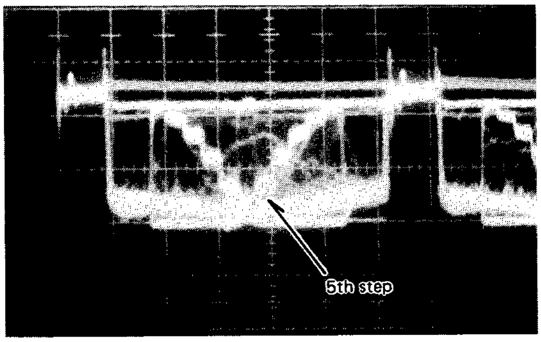


Fig. 50

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust the iris control so that output level becomes minimum (100 mV approx.)
6) Alternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform.
7) Adjust the iris control to the mid-position.

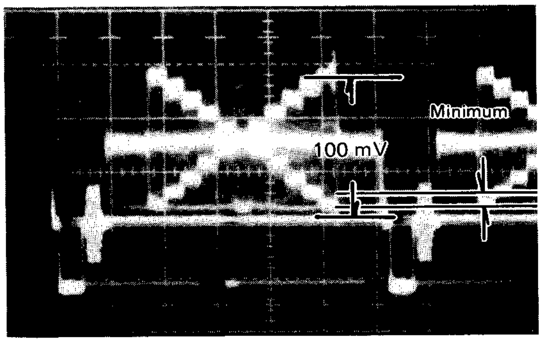


Fig. 51

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.1 V ± 0.02 V.

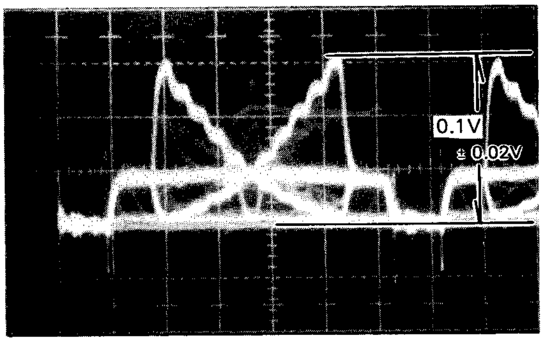


Fig. 52

11. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

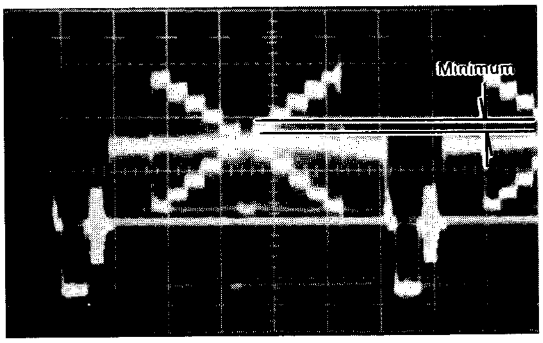


Fig. 53

12. De-γ (Degamma) adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st – 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th – 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

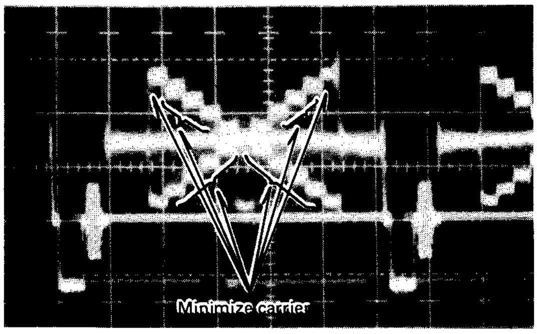


Fig. 54

13. Vertical false signal elimination adjustment

RV28: Video board

1) Shoot the gray scale chart.
2) Adjust RV28 so that the vertical false signal on the bottom of the gray scale on the TV screen is minimized.

14. Chroma gain, burst level adjustment

TP3: Video board
RV 4, 24, 26: Video board
Iris control: Side of camera

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the color bar chart.
3) Set the white level of the video signal color bar to 1.2 Vp-p using the iris control.
4) Adjust RV24 so that the red carrier level is 0.96Vp-p.
5) Adjust RV26 to set the yellow carrier level of the waveform to 0.48 Vp-p ± 0.04V.
   When red carrier level is not set to 0.96 ± 0.04 Vp-p after this setting readjust RV24.
6) Adjust RV4 to set the burst level to 0.6 Vp-p ± 0.02 V.
7) Return the iris control to its click position.

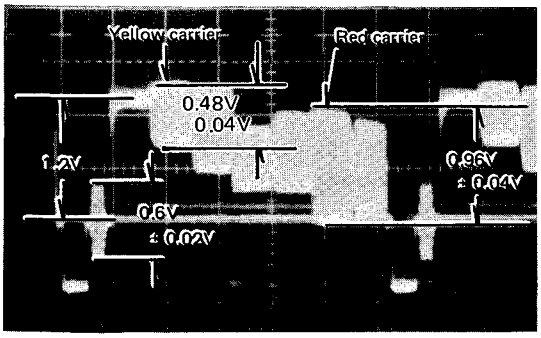


Fig. 55

15. Red phase adjustment

RV21: Video board

1) Shoot the color bar chart.
2) Adjust RV21 so that the tint of the red of both the TV screen and the color bar chart match as much as possible.

16. Auto white preset adjustment

RV201, 202: Auto white board on the video board
TP12, 14: Video board.

1) Connect an oscilloscope (50 mV/div) to TP12 on the video board.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Set the white balance switch to "SET" position.
4) Confirm that same level appears at both video period and blanking period, by checking TP12. When video level is lower than blanking, rotate RV201 clockwise, and when video level is higher, rotate it counterclockwise. Set white balance again.
5) Repeat the procedures (3) and (4) until the same level of video and blanking is obtained at TP12.
6) Connect the oscilloscope to TP14 and adjust RV202 so that both video level and blanking level are same, by taking same procedures of (3) to (5).

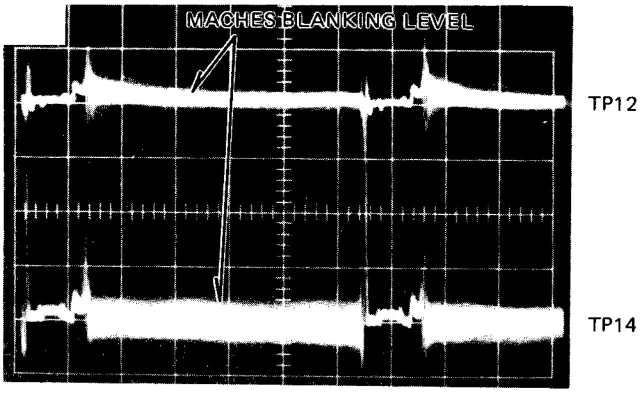


Fig. 56

17. Chroma killer adjustment

RV25: Video board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Set the indoor/outdoor switch to "INDOOR".
4) Set white balance.
5) Set the indoor/outdoor switch to "OUTDOOR".
6) Adjust RV25 so that the carrier level at the 9th steps of the staircase waveform is 180 mVp-p ±20 mV.
7) Return the iris control to iris click position and the indoor/outdoor to "INDOOR" position.

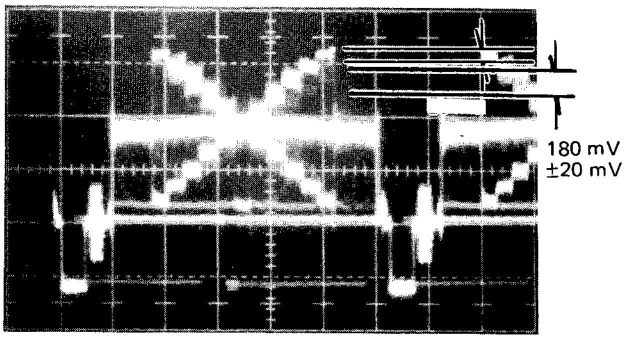


Fig. 57

18. Negative video color phase adjustment

RV20: Video board

1) Set the negative/positive switch on the back of the camera to "NEG" position.
2) Shoot the color bar chart.
3) Adjust RV20 so that the tint at the right end section of the color bar of the TV screen match to the tint at yellow of the color bar chart as much as possible.

19. Low light warning indicator level adjustment

RV323, 324: Deflection board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Display the operation check pattern on the viewfinder by pressing the check/normal button.
4) Adjust RV324 so that the video signal level is 0.8 Vp-p ± 0.05 V.
5) Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW".
6) After above adjustment is completed, readjust the video level, item 7.

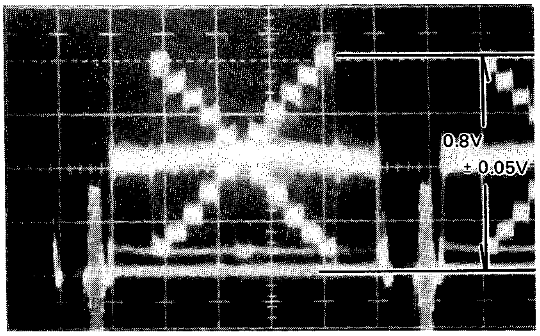


Fig. 58

3. ADJUSTMENT DEFLECTION CIRCUIT BOARD

1. Power voltage adjustment

RV451 ~ 454: Deflection board
TP306 ~ 309: Deflection board

1) Connect a DC voltmeter to TP306 on the deflection board.
2) Adjust RV451 so that the voltmeter indicates 9.0 V ± 0.01 V.
3) Connect a DC voltmeter to TP308 on the deflection board.
4) Adjust RV452 so that the voltmeter indicates 5.0 V ± 0.01 V.
5) Connect a DC voltmeter to TP307 on the deflection board.
6) Adjust RV453 so that the voltmeter indicates 5.0 V ± 0.01 V.
7) Connect a DC voltmeter to TP309 on the deflection board.
8) Adjust RV454 so that the voltmeter indicates 5.1 V ± 0.01 V.

2. Beam voltage adjustment

RV302, 326: Deflection board
(RV301, 303, 304, 305, 306, LV301: Deflection board)
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the test chart A.
3) Turn RV302 clockwise to make the picture appear when the picture does not appear on the TV screen.
4) Bring the picture into focus while observing the TV screen.
   Adjust RV301 to bring the picture into focus.
   * Item 5 is not required when the circle of the chart appears round while observing the TV screen.
5) When the circle of the chart is not round on the TV screen, adjust the control VRs shown below so that it is made round and the size roughly matches.
   RV303: Horizontal linearity
   RV304: Horizontal centering
   LV301: Horizontal size (WIDE)
   RV305: Vertical size (HEIGHT)
   RV306: Vertical centering
6) Connect an oscilloscope to TP1 on the video board.
7) Turn RV326 fully counterclockwise.
8) Shoot the chart as shown in Fig. 61.
   Set the zoom to the same position as that when the test chart A is shot in item 2.

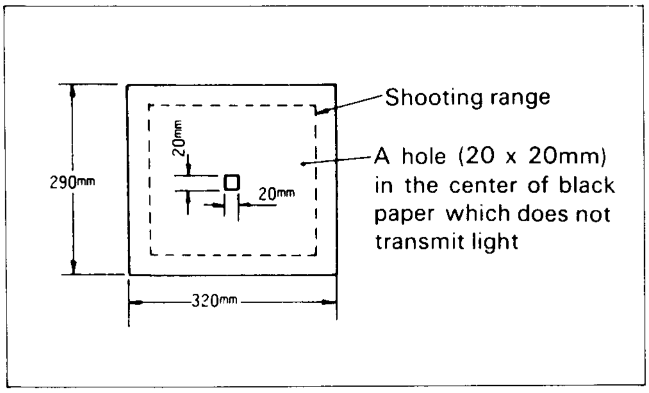

Shooting range
A hole (20 x 20mm) in the center of black paper which does not transmit light
290mm
320mm
20mm
20mm

Fig. 61

9) Adjust RV302 so that the click level of the beam is 1.5 Vp-p ± 0.05 V.

10) Adjust RV326 so that the click level of the beam is 2.4 Vp-p ± 0.1 V.

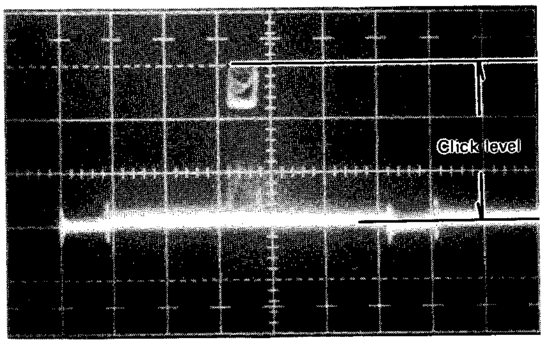
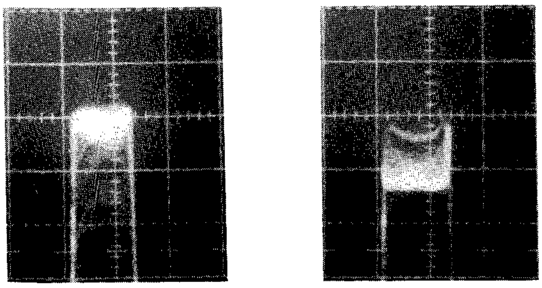


Fig. 62

When the camera is aimed at the chart and the waveform becomes as in Fig. 63 (a), adjustment cannot be performed correctly, so turn the iris control to increase the incident light and obtain the waveform as in (b).



(a) (b)

Fig. 63

3. Horizontal size/linearity/centering adjustment

RV303, 304, LV301: Deflection board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot a white chart and set the zoom to TELE-PHOTO.
3) Turn LV301 to shorten the waveform width and make optical black appear a little to the left and right.

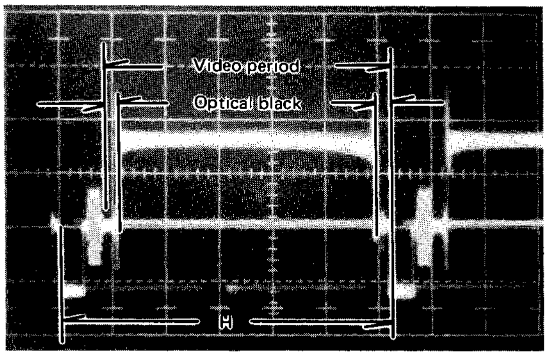
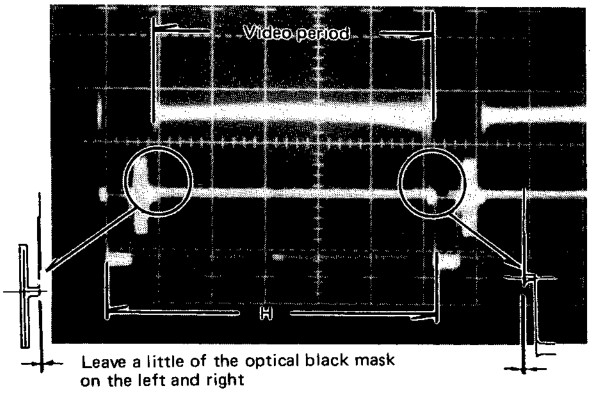


Fig. 64

4) Adjust RV304 so that the left and right optical black is symmetrical.
5) Shoot the test chart A.
6) Adjust RV303 so that the circle on the TV screen is symmetrical to the left and right.
7) Shoot a white chart and set the zoom to TELE-PHOTO.
8) Adjust LV301 so that the optical black mask remains a little on the left and right. Fine adjust RV304 at this time so that the optical black mask is symmetrical on the left and right.



Leave a little of the optical black mask on the left and right

Fig. 65

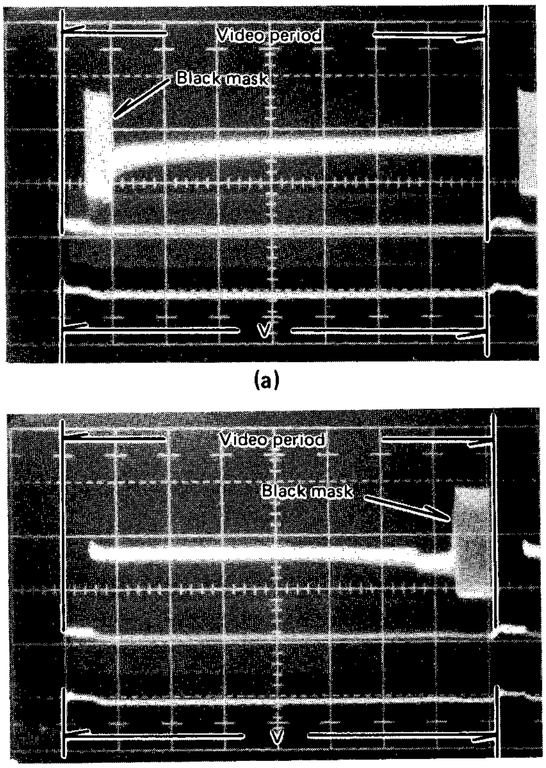
Note: When the above adjustment is not performed properly, best and shading may occur.

4. Vertical size/centering adjustment

RV305, 306: Deflection board
TP3, TP1: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the white chart and set the zoom to TELE-PHOTO.
3) Set the oscilloscope to the V period.

4) Turn RV305 to shorten the wave width and make black mask appear a little on the left and right.
   - * The black mask is seen as a green horizontal bar on the TV screen.


Video period
Black mask
V
Video period
Black mask
V

(a)

(b)

Fig. 66

5) Adjust RV306 so that the black mask is symmetrical on the left and right.
6) Connect the oscilloscope set to the V period to TP1 on the video board.
7) Adjust RV305 so that beats in the waveform are minimum.

*When RV305 is turned, the width increases as beats in the waveform decrease. Adjust finely RV306 so that the black mask is symmetrical on the left and right.

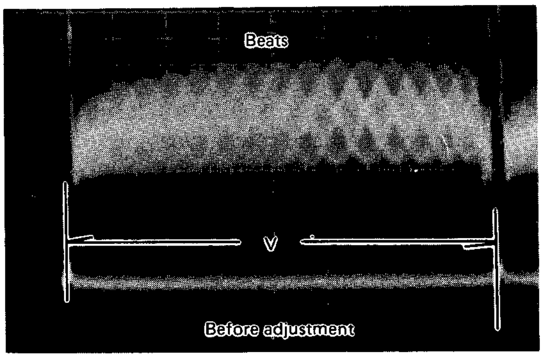

Beats
V
Before adjustment

Fig. 67

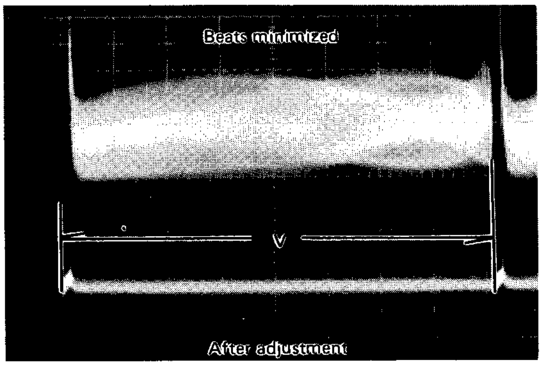

Beats minimized
V
After adjustment

Fig. 68

5. Bias light adjustment

RV325: Deflection board
TP1: Video board

1) Fit the lens cap.
2) Set the probe to 1:1 and connect it to TP1 on the video board via a resistor (4.7 kΩ — 10 kΩ)
   - * When the probe is held near the tip, noise is picked up.

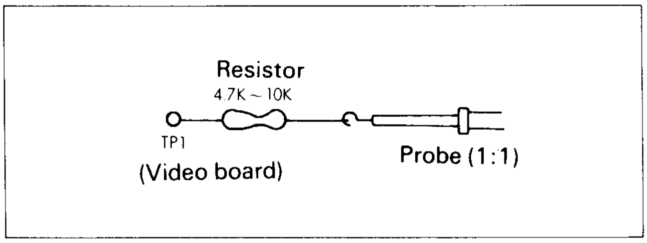

Resistor
4.7K ~ 10K
TP1
(Video board)
Probe (1:1)

Fig. 69

3) Adjust RV325 so that the level at the waveform center is 20 mVp-p ± 2 mV.

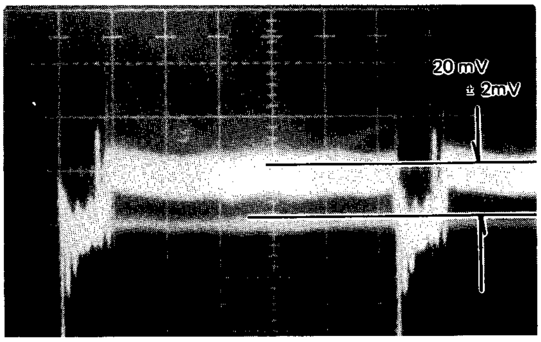


Fig. 70

6. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP2 on the video board.

3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as possible.

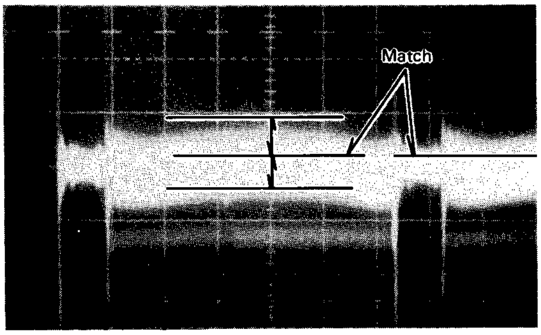
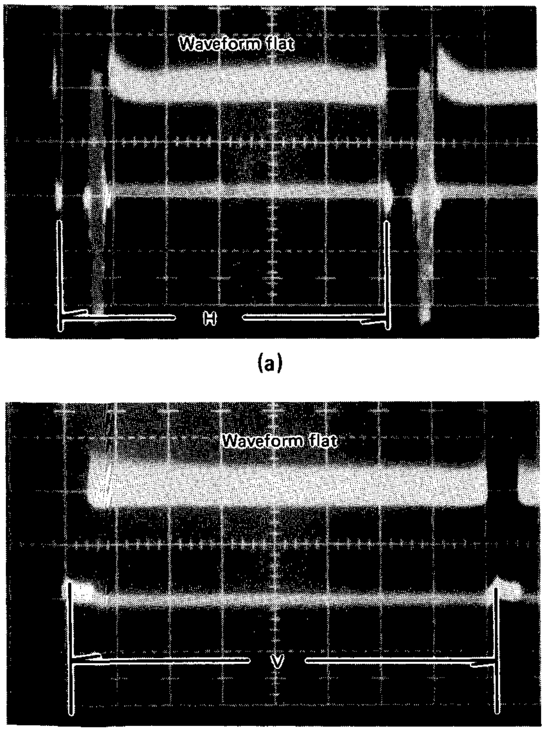


Fig. 71

7. **Dark shading adjustment**

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 on the video board so that the setup level is 30 ~ 60 mVp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 72

8. **Video level adjustment**

RV2: Video board
RV323: Deflection board
TP1, TP3: Video board

1) Set the probe to 1 : 1 and connect it to TP1 on the video board via a resistor 14.7 kΩ ~ 10 k Ω) (See Fig. 69).
2) Shoot the gray scale chart.
3) Adjust RV323 so that the video signal component of the waveform is 600 mVp-p ± 20 mV.

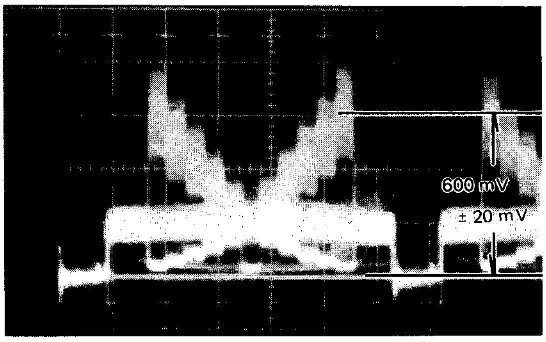


Fig. 73

4) Connect an oscilloscope to TP3 on the video board.
5) Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05 V.

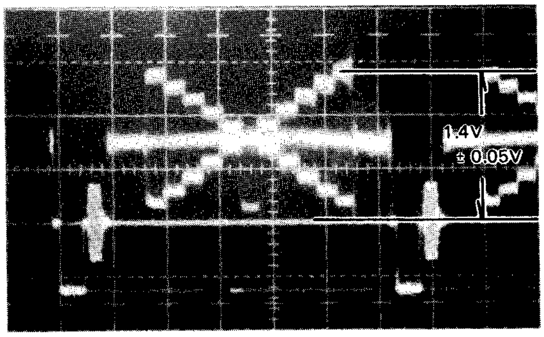


Fig. 74

9. **Field focus adjustment**

RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP301 ~ 305: Deflection board
TP5: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Connect an oscilloscope to TP301 on the deflection board.
3) Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
4) Connect an oscilloscope to TP5 on the video board.
5) Shoot a white chart and set the zoom to TELE-PHOTO.

6) Adjust RV301 so that the carrier level is max. and the flat range without peaks or troughs is as wide as possible.
* This is to faciliate shading correction later.

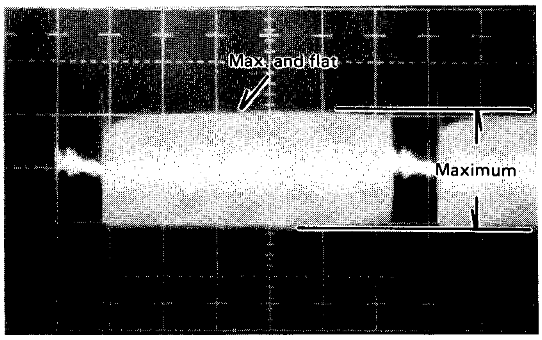


Fig. 75

10. Chroma carrier level adjustment

RV3: Video board
TP5: Video board

1) Connect an oscilloscope to TP5 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV3 so that the waveform level is 150 mVp-p ± 20 mV.
* Use the oscilloscope with the probe set to 1:1. Otherwise, the black portion (1st ~ 4th steps from the bottom) of the staircase waveform is distorted.

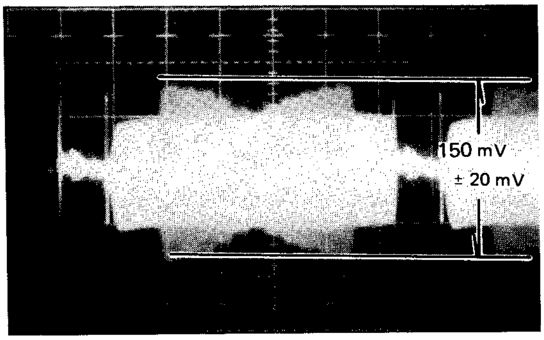


Fig. 76

11. Color separation adjustment

TP7: Video board
RV7, 8: Video board

1) Connect an oscilloscope to TP7 on the video board.
2) Shoot the color bar chart.
3) Alternately adjust RV7 and RV8 to minimize the yellow level of the waveform.

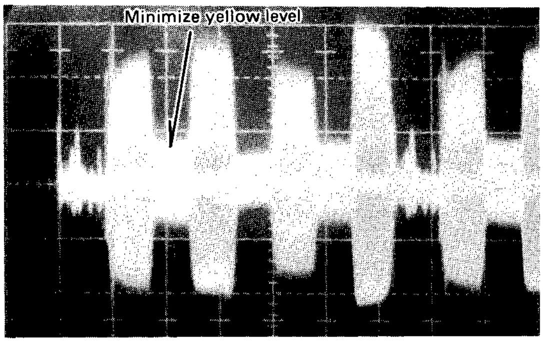


Fig. 77

Note: For easy observation, rotate RV17 a little clockwise. After the chroma separation adjustment, set RV17 to the initial position. (Adjust white balance.)

12. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step from the top of the staircase waveform appear.

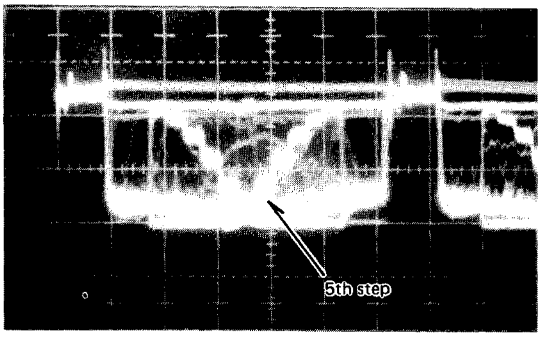


Fig. 78

4) Connect an oscilloscope to TP3 on the video board. Adjust the iris control so that output level becames minimum (100 mVp-p approx.)
5) Alternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform. Adjust the iris control to the mid-position.

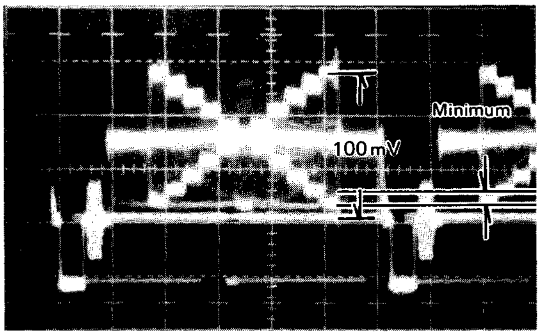


Fig. 79

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.1 V ± 0.02 V.

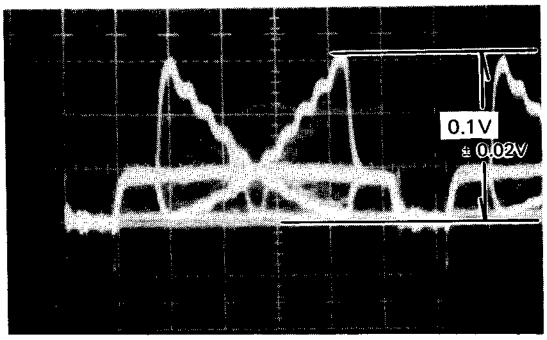


Fig. 80

13. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

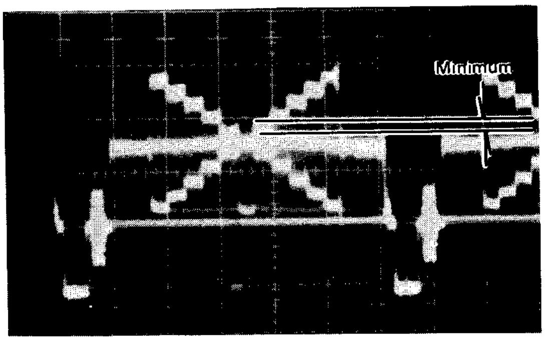
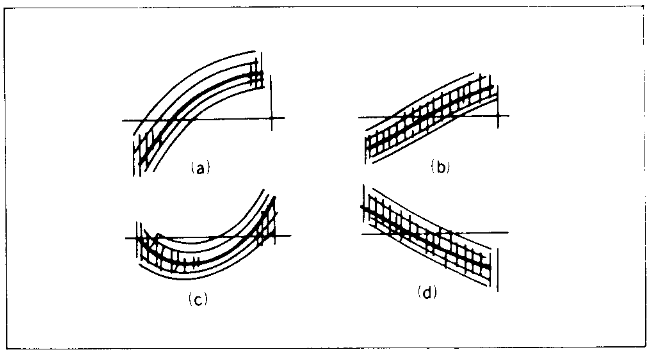


Fig. 81

14. Dynamic focus adjustment

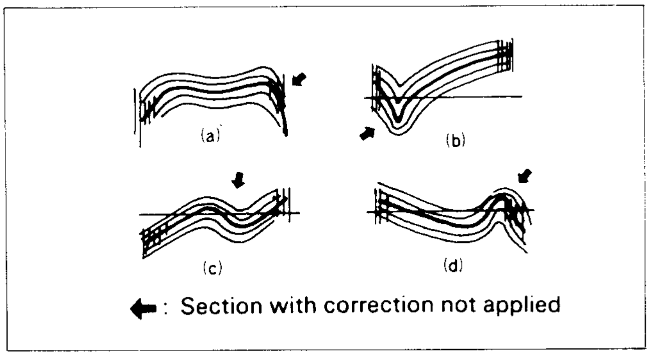
RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP12, TP14: Video board
TP302, 303, 304, 305: Deflection board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Connect one channel of an oscilloscope to TP12 (R-YL) on the video board and the other channel to TP14 (B-YL).
4) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used) for both channels and set to the DUAL mode.
5) Adjust RVM1-1, RVM1-2 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

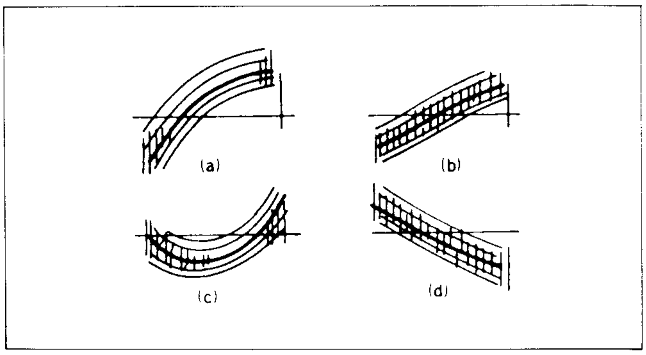
Fig. 82



Waveform making it easy to correct shading

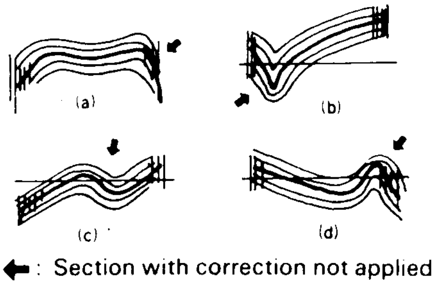
Fig. 83

6) Set an oscilloscope to the V period.
7) Adjust RVM1-3, RVM1-4 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 84



Waveform making it difficult to correct shading

Fig. 85

8) Remove short-circuit.
9) When the waveform making it easy to apply shading correction cannot be obtained by the above adjustment, adjust the field focus in item 9, and then perform adjustment in 7) ~ 9), item 14 again.

15. Red/modulation shading adjustment

RVM3-1, 3-2, 3-3, 3-4: Deflection board
TP12: Video board

1) Shoot the white chart and set the zoom to TELEPHOTO.
2) Connect an oscilloscope to TP12 on the video board.
3) Set the input range of an oscillorscope to 10 mV/div (10:1 probe used).
4) Adjust RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

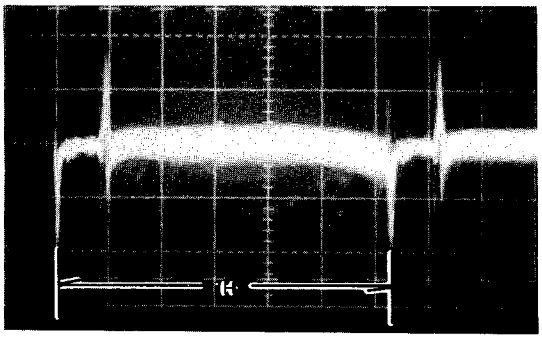


Fig. 86

5) Set an oscilloscope to the V period.
6) Adjust RVM3-3 and RVM3-4 so that the waveform is flat as possible.

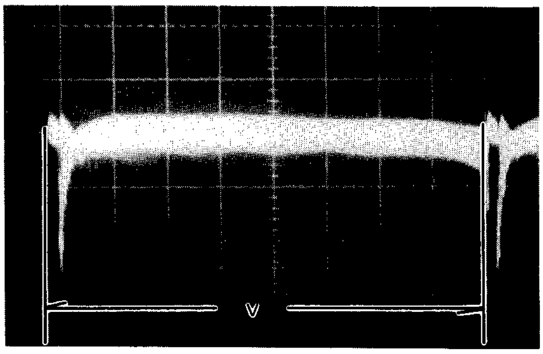


Fig. 87

16. Blue/modulation shading adjustment

RVM4-1, 4-2, 4-3, 4-4: Deflection board
TP14: Video board

1) Shoot the white chart and set the zoom to TELEPHOTO.
2) Connect an oscilloscope to TP14 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

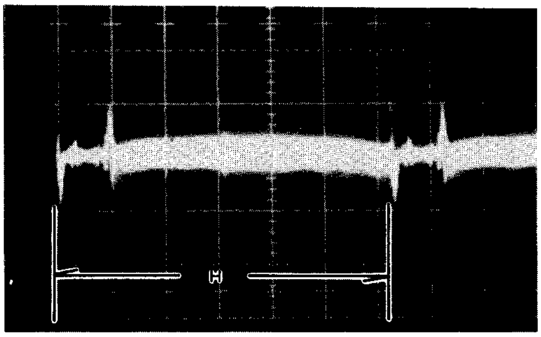


Fig. 88

5) Set an oscilloscope to the V period.
6) Adjust RVM4-3 and RVM4-4 so that the waveform is as flat as possible.

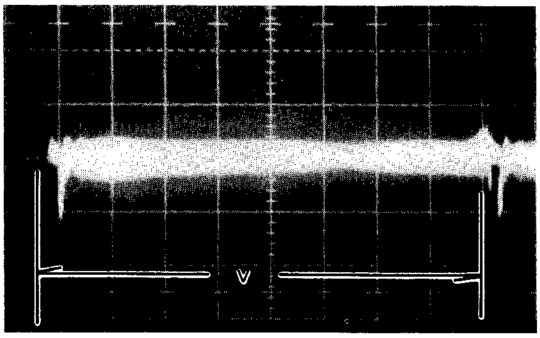


Fig. 89

17. White balance readjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

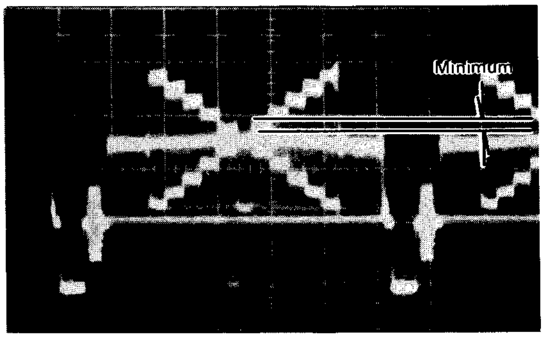


Fig. 90

18. De-γ (Degamma) adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st ~ 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th ~ 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

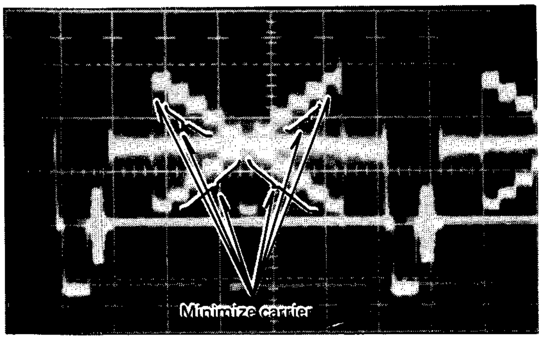


Fig. 91

19. Chroma gain, burst level adjustment

TP3: Video board
RV4, 24, 26: Video board
Iris control: Side of camera

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the color bar chart.
3) Set the white level of the video signal color bar to 1.2 Vp-p using the iris control.
4) Adjust RV24 so that the red carrier level is 0.96Vp-p.
5) Adjust RV26 to set the yellow carrier level of the waveform to 0.48 Vp-p ±0.04V.
   When red carrier level is not set to 0.96 ± 0.04Vp-p after this setting readjust RV24.
6) Adjust RV4 to set the burst level to 0.6 Vp-p ± 0.02 V.
7) Return the iris control to its click position.

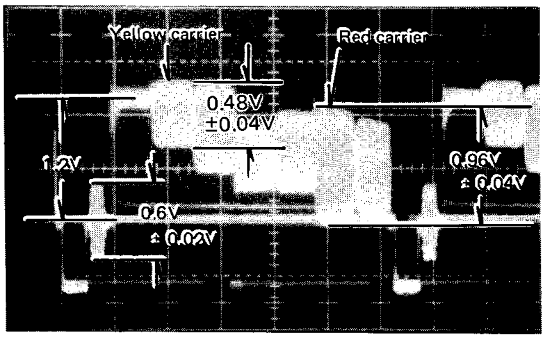


Fig. 92

20. Red phase adjustment

RV21: Video board

1) Shoot the color bar chart.
2) Adjust RV21 so that the tint of the red of both the TV screen and the color bar chart match as mush as possible.

21. Auto white preset adjustment

RV201, 202: Auto white board on the video board
TP12, 14: Video board

1) Connect an oscilloscope (50 mV/div) to TP12 on the video board.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Set the white balance switch to "SET" position.
4) Confirm that same level appears at both video period and blanking period, by checking TP12. When video level is lower than blanking, rotate RV201 clockwise, and when video level is higher, rotate it counterclockwise. Set white balance again.
5) Repeat the procedures 3) and 4) until the same level of video and blanking is obtained at TP12.
6) Connect the oscilloscope to TP14 and adjust RV202 so that both video level and blanking level are same, by taking same procedures of 3) to 5).

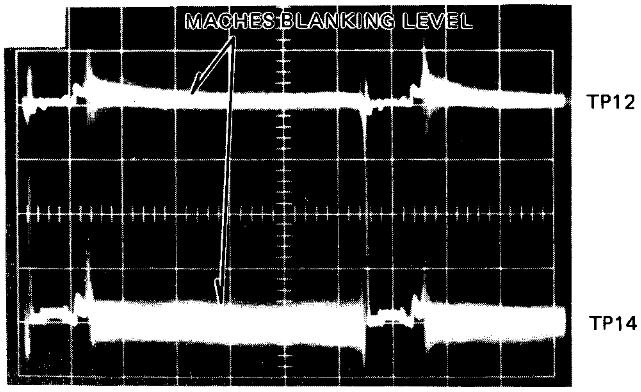


Fig. 93

22. Low light warning indicator level adjustment

RV323, RV324: Deflection board
TP3: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Display the operation check pattern on the viewfinder by pressing the check/normal button.
4) Adjust RV324 so that the video signal level is 0.8 Vp-p ± 0.05 V.
5) Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW".
6) After above adjustment is completed, readjust the video level, item 8.

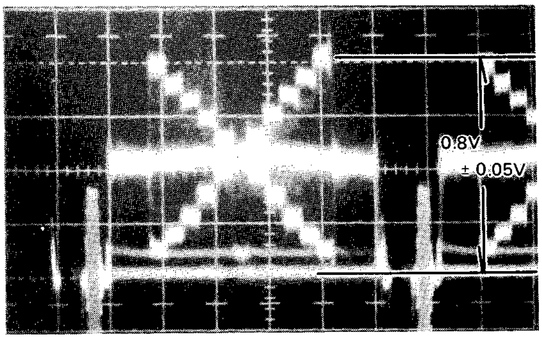


Fig. 94

4. ADJUSTMENT PREAMPLIFIER CIRCUIT BOARD

1. Pulse canceller adjustment

RV1: Video board
TP2: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP2 on the video board.
3) Adjust RV1 so that the center of both the video period and the blanking period match as mush as possible.

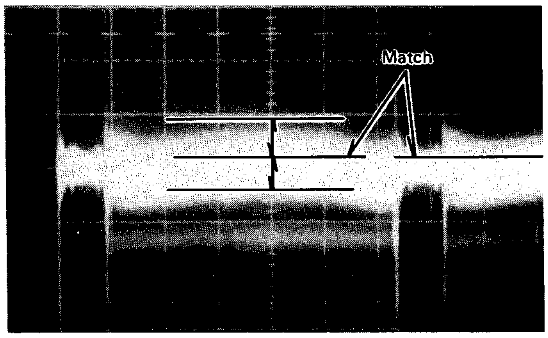


Fig. 101

2. Smear adjustment

CV501: Preamplifier board

This adjustment is performed only when color smear is present. Readjust Chroma carrier level, Black balance. White balance and De-γ (Degamma) again when smear has been adjusted.

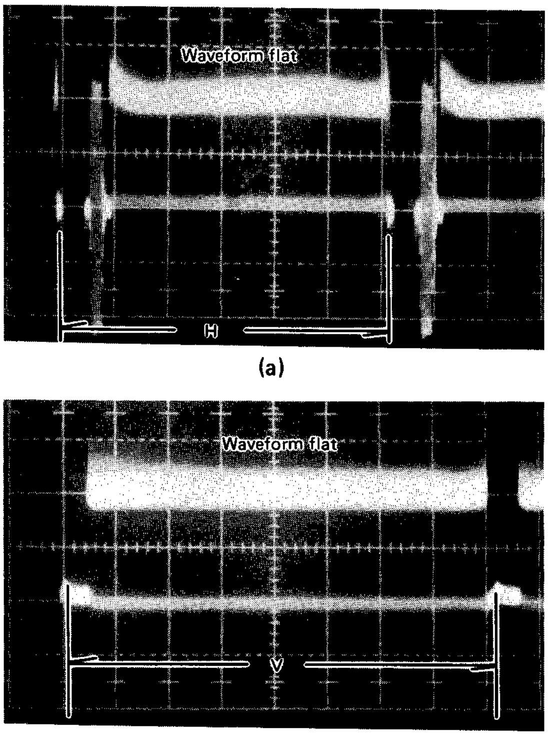
1) Shoot the gray scale chart.
2) Adjust CV501 so that color smear does not occur on the right of the white section of the gray scale on the TV screen.

5. FAULTY SHADING ADJUSTMENT

1. Dark shading adjustment

RVM2-1, 2-2, 2-3, 2-4: Deflection board
(RV6: Video board)
TP3: Video board

1) Fit the lens cap.
2) Connect an oscilloscope to TP3 on the video board.
3) Preadjust RV6 on the video board so that the setup level is 30~ 60 mVp-p.
4) Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible.
5) Set an oscilloscope to the V period.
6) Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible.



(a)

(b)

Fig. 111

2. Field focus adjustment

RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP301-305: Deflection board
TP5: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Connect an oscilloscope to TP301 on the deflection board.
3) Preadjust RVM1-1 - RVM1-4 so that the waveform is minimized.
4) Connect an oscilloscope to TP5 on the video board.
5) Shoot a white chart and set the zoom to TELEPHOTO.
6) Adjust RV301 so that the carrier level is max. and the flat range without peaks or troughs is as wide as possible.
   * This is to faciliate shading correction later.

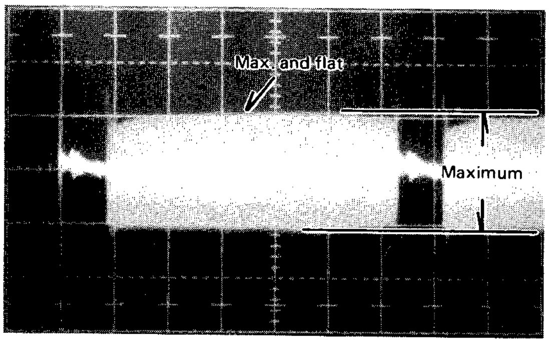


Fig. 112

3. Black balance adjustment

TP8, TP3: Video board
Pin 6 of IC3: Video board
RV5, 22, 23, 30: Video board

1) Connect an oscilloscope to TP8 on the video board.
2) Shoot the gray scale chart.
3) Adjust RV5 so that the 5th step from the top of the staircase waveform appear.

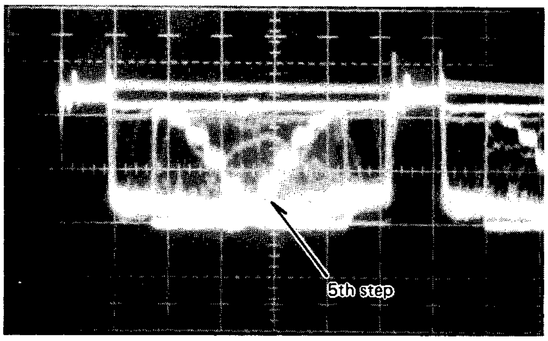


Fig. 113

Adjust the iris control so that output level becames minimum (100 mVp-p approx.)

4) Connect an oscilloscope to TP3 on the video board.
5) Tlternately adjust RV22 and RV23 to minimize the carrier level at the 1st step from the bottom of the staircase waveform. Adjust the iris control to the mid-position.

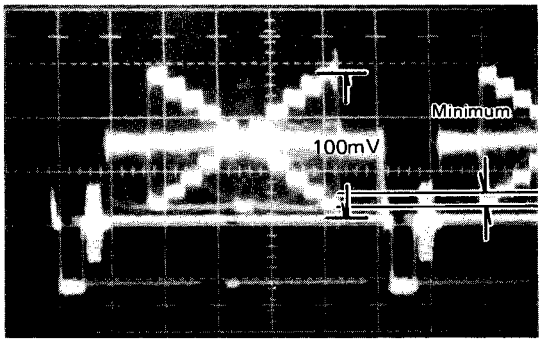


Fig. 114

6) Connect an oscilloscope to pin 6 of IC3 on the video board.
7) Adjust RV30 so that the staircase waveform level from the pedestal is 0.1 V ± 0.02 V.

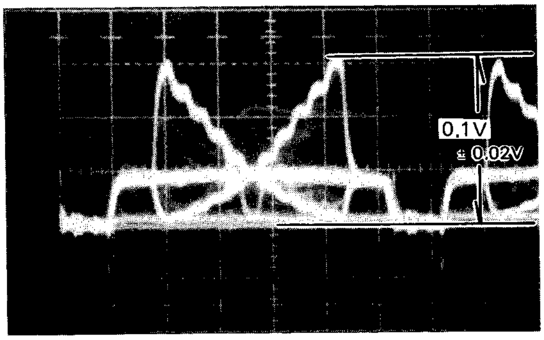


Fig. 115

4. White balance adjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

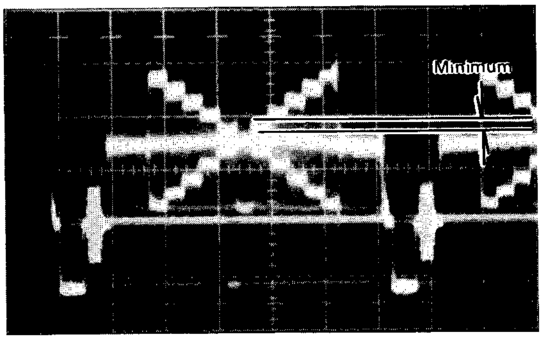
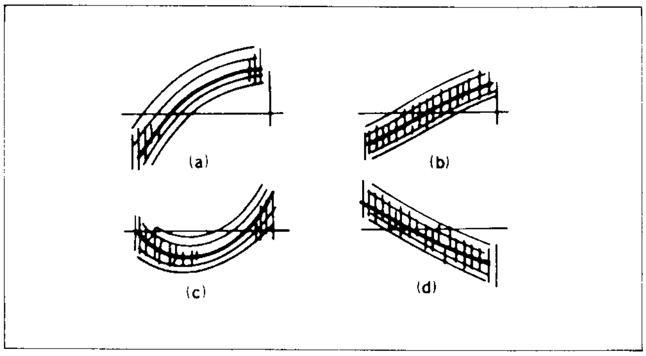


Fig. 116

5. Dynamic focus adjustment

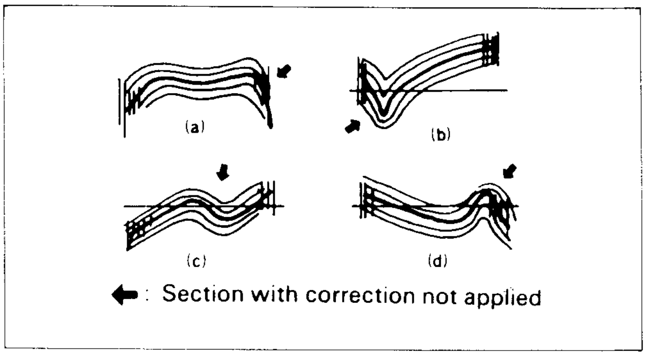
RVM1-1, 1-2, 1-3, 1-4, RV301: Deflection board
TP12, TP14: Video board

1) Short between TP302 and TP303 and between TP304 and TP305.
2) Shoot the white chart and set the zoom to TELEPHOTO.
3) Connect one channel of an oscilloscope to TP12 (R-YL) on the video board and the other channel to TP14 (B-YL)
4) Set input range of an oscilloscope to 10 mV/div (10:1 probe used) for both channels and set to the DUAL mode.
5) Adjust RVM1-1, RVM1-2 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

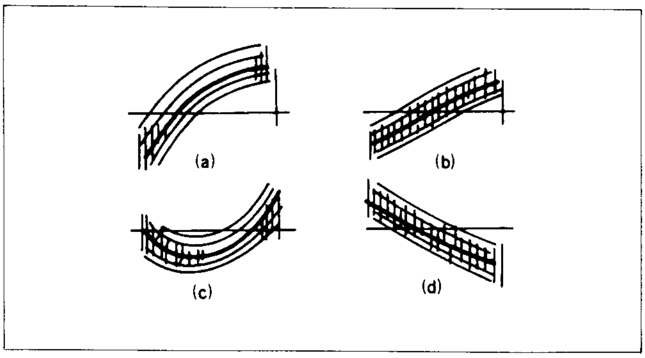
Fig. 117



Waveform making it difficult to correct shading

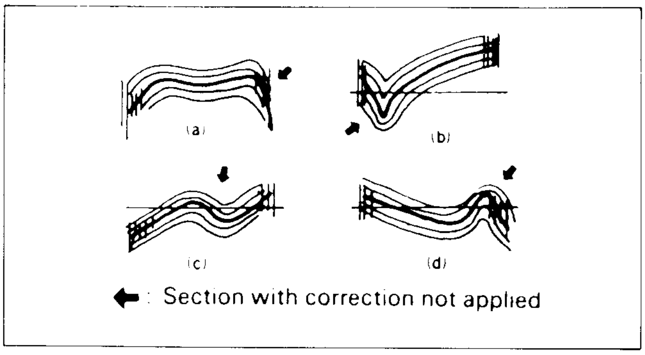
Fig. 118

6) Set an oscilloscope to the V period.
7) Adjust RVM1-3, RV1-4 and RV301 so that the waveforms at TP12 and TP14 are easy to correct shading.



Waveform making it easy to correct shading

Fig. 119



Waveform making it difficult to correct shading

Fig. 120

8) Remove short-circuit.
9) When the waveform making it easy to apply shading correction cannot be obtained by the above adjustment adjust the field focus in item 2, and then adjust as shown in 5) ~ 7), item 5 again.

6. Red/modulation shading adjustment

RVM3-1, 3-2, 3-3, 3-4: Deflection board
TP12: Video board

1) Shoot the white chart and set the zoom to TELEPHOTO.
2) Connect an oscilloscope to TP12 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

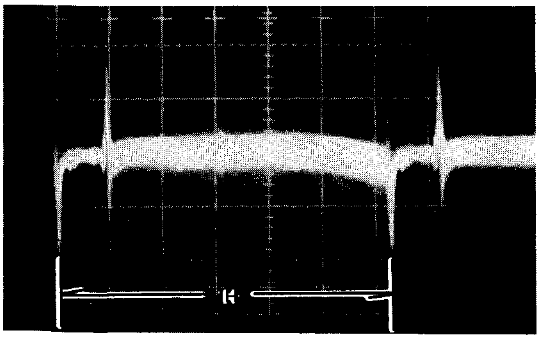


Fig. 121

5) Set an oscilloscope to the V period.
6) Adjust RVM3-3 and RVM3-4 so that the waveform is as flat as possible.

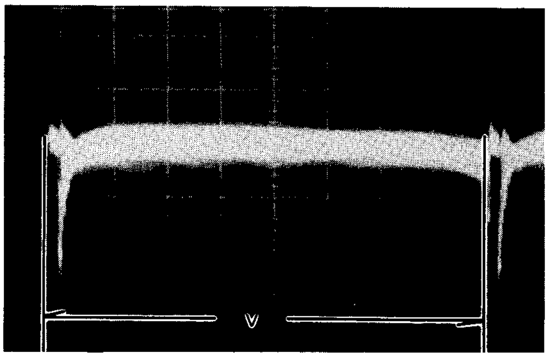


Fig. 122

7. Blue/modulation shading adjustment

RVM4-1, 4-2, 4-3, 4-4: Deflection board
TP14: Video board

1) Shoot the white chart and set the zoom to TELEPHOTO.
2) Connect an oscilloscope to TP14 on the video board.
3) Set the input range of an oscilloscope to 10 mV/div (10:1 probe used).
4) Adjust RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

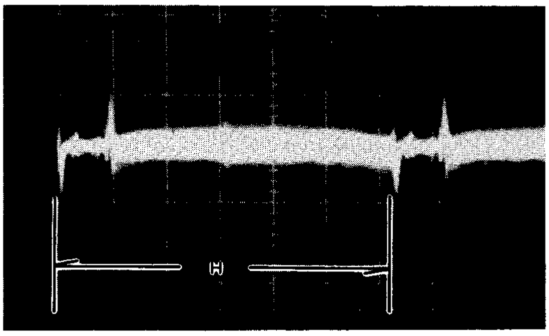


Fig. 123

5) Set an oscilloscope to the V period.
6) Adjust RVM4-3 and RVM4-4 so that the waveform is as flat as possible.

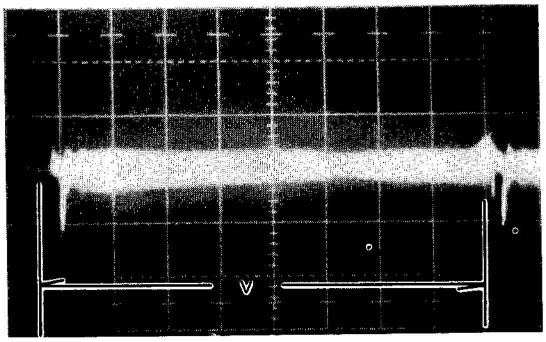


Fig. 124

8. White balance readjustment

TP3: Video board
RV13, 17: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV13 and RV17 to minimize the carrier at 6th and 7th steps from the bottom of the staircase waveform.

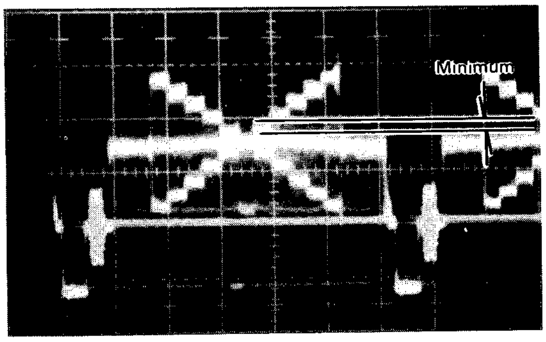


Fig. 125

9. De-γ (Degamma) Adjustment

TP3: Video board
RV10 ~ 12, RV14 ~ 16: Video board

1) Connect an oscilloscope to TP3 on the video board.
2) Shoot the gray scale chart.
3) Alternately adjust RV12 and RV16 to minimize the carrier level at the 1st – 5th steps from the bottom of the staircase waveform.
4) Alternately adjust RV11 and RV15 to minimize the carrier level at the 8th – 10th steps from the bottom of the staircase waveform.
5) Alternately adjust RV10 and RV14 to minimize the carrier level at the 1st step from the top of the staircase waveform.

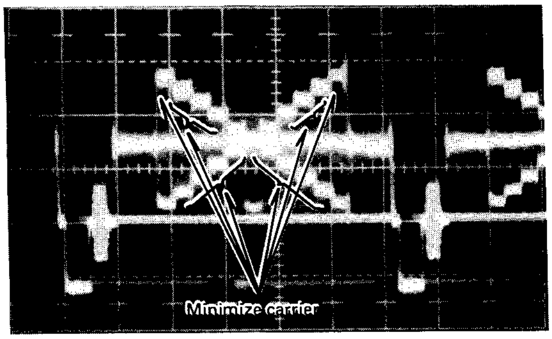


Fig. 126

6. ADJUSTMENT VIEWFINDER CIRCUIT BOARDS

1. Horizontal hold adjustment

RV1151: Viewfinder 2 board
TP1151, 1152: Viewfinder 2 board

1) Short between TP1151 and TP1152.
2) Adjust RV1151.
3) Remove short-circuit.

2. Vertical hold adjustment

RV1152: Viewfinder 2 board
TP1151, 1152, 1154: Viewfinder 2 board

1) Short between TP1151 and TP1152.
2) Connect a frequency counter to TP1154 on the viewfinder 2 board.
3) Adjust RV1152 so that the frequency counter indicates
   55.5 Hz± 3 Hz.
4) Remvoe short-circuit.

3. Centering adjustment

Set the raster position using the centering magnet attached to the deflection yoke.

4. Horizontal size adjustment

LV1101: Viewfinder 1 board

1) Shoot the test chart A.
2) Adjust LV1101 so that the horizontal size of the viewfinder screen matches to the horizontal size of the TV screen.

5. Vertical size adjustment

RV1153: Viewfinder 2 board

1) Shoot the test chart A.
2) Adjust RV1153 so that the circle on the TV screen is symmetrical to the left and right.

6. Brightness adjustment

RV1102: Viewfinder 1 board
TP1101, 1102: Viewfinder 1 board

1) Shoot the test chart A.
2) Turn RV1101 fully counterclockwise.
3) Connect a DC voltmeter to TP1101 and TP1102.
4) Adjust RV1102 so that the DC voltmeter indicates 2.3 V.

7. Contrast adjustment

RV1101: Viewfinder 1 board
TP1101, 1102: Viewfinder 1 board

1) Shoot the test chart A.
2) Connect a DC voltmeter to TP1101 and TP1102.
3) Adjust RV1101 so that the DC voltmeter indicates 3.4 V.

8. Focus adjustment

RV1103: Viewfinder 1 board

1) Shoot the test chart A.
2) Adjust RV1103 so that the sharpness of the picture is best.

7. AUTO FOCUS ADJUSTMENT

1. Focus adjustment

1) Remove the cap. (Fig. 127)
2) Shoot the camera at adjustment chart (B).
   (Illumination of the chart approx, 300 Lux with tungsten lamp.)
3) Set the distance between the chart and the camera lens to 5 m.
4) Focus distance of zoom : 51 mm.
5) Turn the adjustment screw and bring the chart into focus. (Fig.128)
   When the focus is shifted to the infinitive (∞) side, turn the screw clockwise.
   When the focus is shifted to the MACRO side, turn it counterclockwise.
6) Shoot the camera at adjustment chart (C).
7) Set the distance between the chart and the camera lens to 2 m.
8) Adjust as in item 5).
9) When the camera is aimed at charts (B) and (C), both should be in focus.

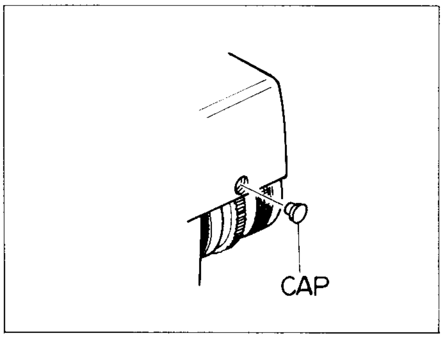


Fig. 127

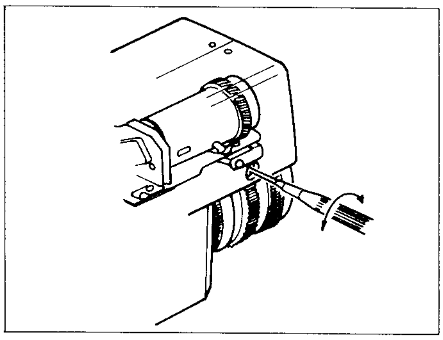
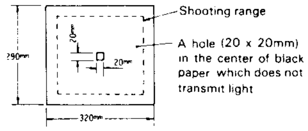
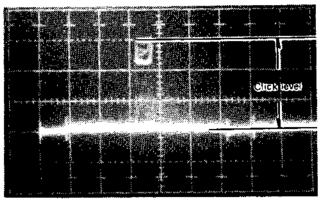


Fig. 128

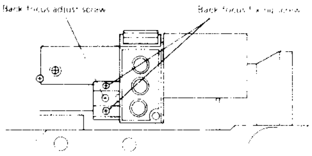
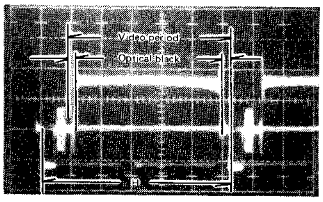
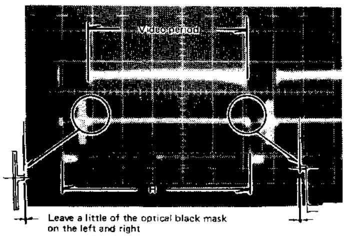
ADJUSTMENT LIST

Purpose of adjustment and picture phenomena are arranged in the order circuit No. purpose of adjustment and picture phenomena.

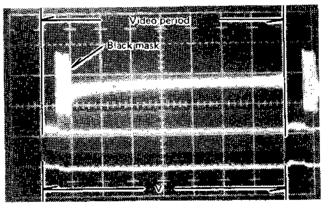
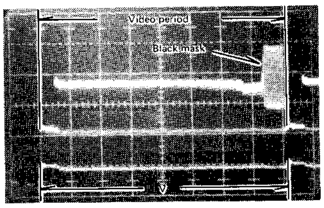
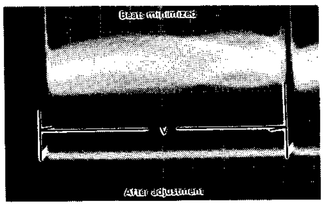
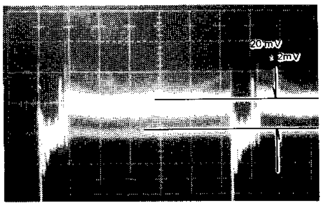
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Beam voltage adjustment	RV302, 326 To adjust electron beam amount of SATICON by varying G1 voltage. ● When the voltage is too low: The high bright (white) sections of the gray scale cannot be discriminated. When the voltage is lowered further, picture does not appear. ● When the voltage is too high: Magenta ghost appears to the right side of the high bright (white) section of the gray scale. Or, horizontal green color appears in that section. Shading amount increases.	TV screen	LV301, RV303 ~ 306 Deflection board	Shoot the test chart A. Adjust LV301, RV303 ~ 306 when the circle of the chart is not round. The adjustment is not required when the circle is approximately round. Adjust the following: RV304: Horizontal centering LV301: Horizontal size (wide) RV303: Horizontal linearity RV306: Vertical centering RV305: Vertical size (height)
			TP1 Video board	RV302 Deflection board	Turn RV326 fully counterclockwise. Shoot the chart shown in the diagram. 1 Shooting range 2 Provide a hole (20 x 20 mm) at the center of a black paper which does not transmit light.  Shooting range A hole (20 x 20mm) in the center of black paper which does not transmit light 290mm 320mm 20mm 20mm Adjust the clip level of the waveform using RV302 and set it to 1.5 Vp-p ± 0.05V. 
				RV326 Deflection board	Adjust RV326 so that the clip level of the beam is 2.4 Vp-p ± 0.1V.
2.	Back-focus adjustment	Back-focus adjustment screw ● To adjust that focusing is obtained when the zoom is set to TELE and WIDE. ● Focus is drifted when the zoom is operated.	TV screen	Back-focus adjusting screw	Set the distance between the color viewer and camera to 3 m. Shoot the test chart A. 1. Zoom: TELEPHOTO Focusing: Focus of lens 2. Zoom: WIDE Focusing: Focus adjusting screw (with focus adjusting screw loose) Adjust TELEPHOTO and WIDE repeatedly. Check that focus is obtained at both TELEPHOTO and WIDE when the distance 10 m or more is shot with the scale set to " ∞ ".

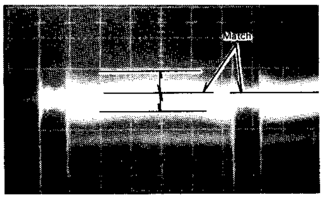
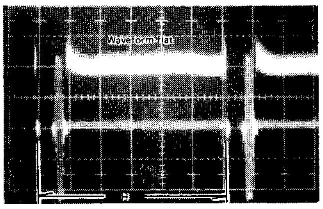
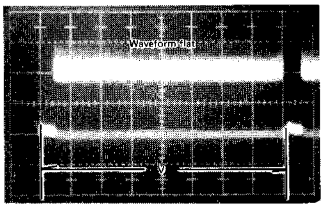
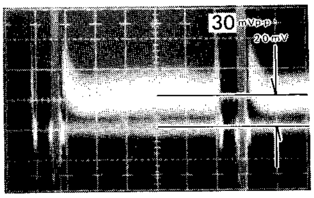
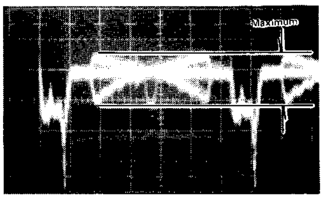
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 Tighten the focus fixing screw after adjustment.
3.	Horizontal size/linearity/ centering adjustment	LV301 To adjust horizontal deflection size. ● The circle chart is distorted. Color balance is not obtained but changes to green. ● Color beat increases.	TP3 Video board	LV301 Deflection board	Shoot white chart. Zoom: TELEPHOTO Adjust LV301 to shorten the waveform width. 
		RV304 To adjust horizontal deflection position. ● Black mask appears on the left or right of the screen.		RV304 Deflecton board	Adjust RV304 so that the optical black mask is symmetrical on the left and right.
		RV303 To adjust horizontal deflection linearity. ● The circle chart is distorted. Color unevenness appears on the left or right. ● Color beat increases.	TV screen	RV303 Deflection board	Shoot the test chart A. Adjust RV303 so that the circle on the TV screen is symmetrical on the left and right.
		Note: When the above adjustment is not performed properly, best and shading may occur.	TP3 Video board	LV301 (RV304)	Shoot the white chart. Zoom: TELEPHOTO Adjust LV301 so that a little optical black mask remains on the left and right. Fine adjust RV304 so that the optical black mask is symmetrical on the left and right. 
4.	Vertical size/centering adjustment	RV305 To adjust vertical deflection size. ● The circle chart is distorted (becomes an ellipse). RV306 To adjust vertical deflection centering. ● The circle chart is distorted. Green mask appears at the top or bottom of the screen.	TP3 Video board	RV305 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the oscilloscope to the V period. Adjust RV305 to shorten the waveform width and make the black mask appear on the left and right.

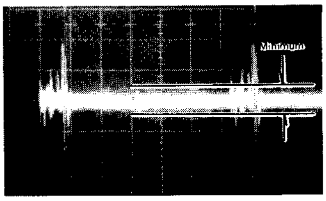
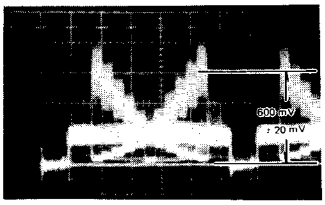
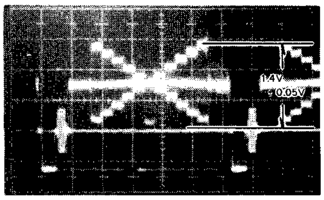
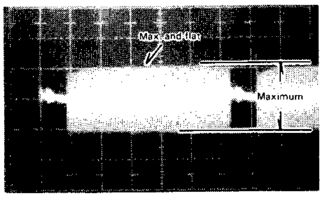
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 
				RV306 Deflection board	Adjust RV306 so the black mask is symmetrical on the left and right.
			TP1 Video board	RV306 (RV306)	Adjust RV305 to minimize waveform beats. Fine adjust RV306 so that the black mask is symmetrica on the left and right. 
5.	Bias light adjustment	RV325 To adjust bias light potential. ● When the voltage is too low, residual image increases under lower illumination. ● When the voltage is too high, shading amount increases.	TP1 Video board	RV325 Deflection board	Fit the lens cap. Set the probe to 1 : 1 and connect to TP1 via a resistor. Adjust the level nearer to the center using RV325 so that it is 20 mVp-p ± 2 mV. 
6.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible.

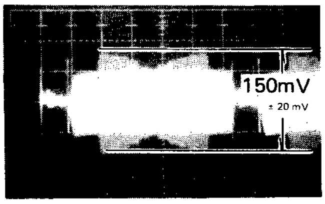
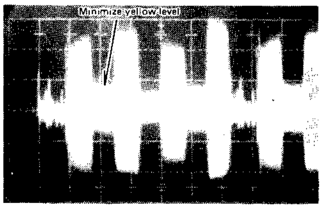
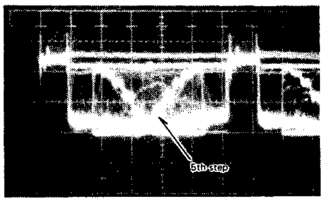
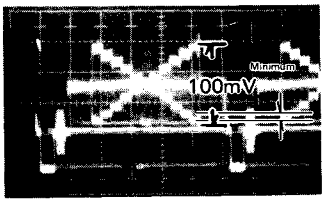
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
7.	Dark shading adjustment	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance uneveness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board	Fit the lens cap. Preadjust RV6 so that the setup level is 30~60 mVp-p.
				RVM2-1, 2-2 Deflection board	Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 
				RVM2-3, 2-4 Deflection board	Set an oscilloscope to the V period. Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
8.	Y setup adjustment	RV6 To adjust setup of the luminance signal. ● Picture becomes whitish or seems sunk.	TP3 Video board	RV6 Video board	Fit the lens cap. Adjust setup using RV6 to set to 30 mVp-p ±20 mV. 
9.	Edge balance adjustment	RV27, 29 To adjust so that only the vertical edge signal is mixed with the luminance signal. ● The whole screen becomes red or green.	TP17 Video board	RV27 Video board	Shoot the gray scale chart. Adjust RV27 to maximize the waveform. 

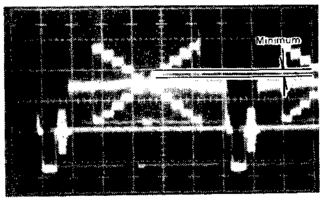
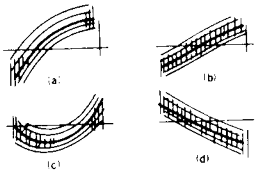
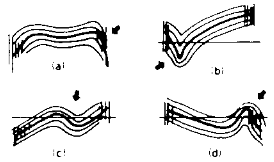
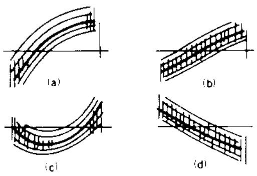
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
				RV29 Video board	Adjust RV29 to minimize the waveform. 
10.	Video level adjustment	RV324 To set the balance point of the automatic iris control to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated. RV2 To set the balance point of the AGC circuit to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP1 Video board	RV324 Deflection board	Shoot the gray scale chart. Set the probe to 1:1 and connect to TP1 via a resistor. Adjust the video signal component of the waveform using RV324 and set it to 600 mVp-p± 20 mV. 
			TP3 Video board	RV2 Video board	Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05V. 
11.	Field focus adjustment	RV301 To adjust the focus electrode voltage of the SATICON so that the electron beam output from the cathode is focused on the photoconductive film. ● Focus is not obtained when the focus ring or the focus adjusting screw of the lens is turned. ● Picture becomes greenish.	TP301 Deflection board TP302 ~ TP305 Deflection board	RVM1-1, 1-2, 1-3, 1-4 Deflection board	Short between TP302 and TP303 and between TP304 and TP305. Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
			TP5 Video board	RV301 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Adjust RV301 so the carrier level is max. and flat without peaks and troughs. 

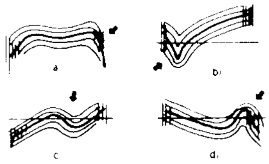
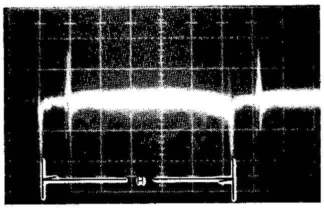
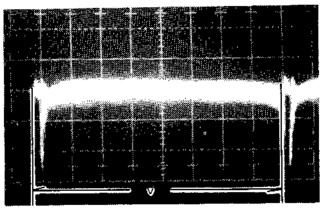
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
12.	Chroma carrier level adjustment	RV3 To adjust the carrier level of the chroma signal. ● No color, tint abnormal.	TP5 Video board	RV3 Video board	Shoot the gray scale chart. Adjust RV3 to set to 150 mVp-p ± 20 mV. 
13.	Color separation adjustment	RV7 To adjust the carrier phase shift with the R/B separation circuit. ● Color reproduction faulty. Mixed color. RV8 To adjust the 1H delayed carrier level of the chroma signal and match it with the chroma signal carrier level of the phase shifter output. ● Color saturation and purity are deteriorated causing mixing of colors.	TP7 Video board	RV7, 8 Video board	Shoot the color bar chart. Adjust RV7 and RV8 alternately to minimize yellow level of the waveform.  Note: For easy observation, rotate RV17 a little clockwise. After the chroma separation adjustment, set RV17 to the initial position. (Adjust white
14.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the birghtness of the object. RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step from the top of the staircase waveform appear. 
		RV23 To adjust setup of the R signal. ● The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. ● The dark portion of the picture becomes discolored.	TP3 Video board	RV22, 23 Video board	Adjust the iris control so that output level becames minimum (100mVp-p approx.) Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase wave. Adjust the iris control to the mid-position. 
			Pin 6 of IC3	RV30 Video board	Adjust RV30 so that the staircase wave level from the pedestal is 0.1 Vp-p ± 0.02V.

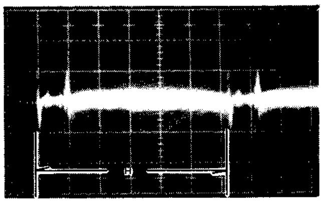
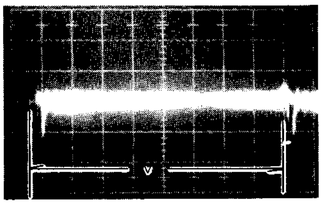
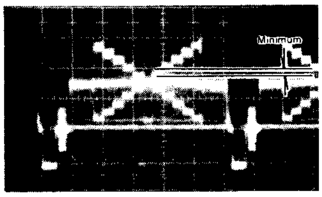
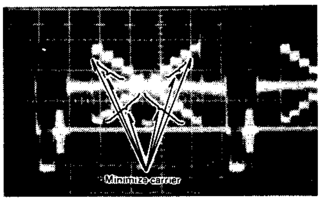
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
15.	White balance adjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
16.	Dynamic focus adjustment	RVM1-1, 1-2, 1-3, 1-4 To correct the peripheral beam focusing of the SATICON. To adjust the amount of dynamic focus. ● Color unevenness increase.	TP302 ~ TP305 Deflection board TP12 Video board TP14 Video board	RVM1-1, 1-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Short between TP302 and TP303 and between TP304 and TP305. Set the input range of both channels of the oscilloscope to 10 mV/div (probe: 10 : 1) and set to DUAL mode. Adjust the waveform using RVM1-1 and RVM1-2 so that it is easy to correct shading.  Waveform making it easy to correct shading.  ⬅ : Section with correction not applied Waveform making it difficult to correct shading.
				RVM1-3, 1-4, RV301 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM1-3, RVM1-4 and RV301 so that it is easy to correct shading.  Waveform making it easy to correct shading.

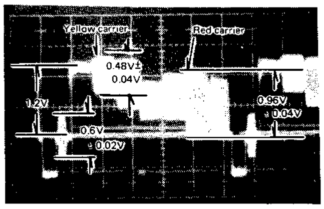
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 ← Section with correction not applied Waveform making it difficult to correct shading. Remove short-circuit.
					* When the waveform easy to correct shading is not obtained by the adjustment shown above, adjust the field focus in item 11, and then perform adjustment shown in item 16 again.
17.	Red/ modulation shading	RVM3-1, 3-2, 3-3, 3-4 To correct R signal color unevenness.	TP12 Video board	RVM3-1, 3-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10: 1). Adjust the waveform using RVM3-1 and RVM3-2 so that the waveform is as flat as possible. 
				RVM3-3, 3-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM3-3 and RVM3-4 so that the waveform is as flat as possible. 
18.	Blue/ modulation shading adjustment	RVM4-1, 4-2, 4-3, 4-4 To correct B signal color unevenness. ● Color unevenness increases.	TP12 Video board	RVM4-1, 4-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM4-1 and RVM4-2 so that the waveform is as flat as possible.

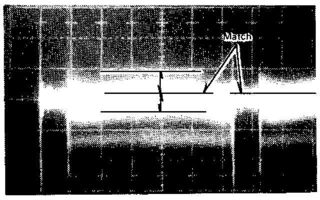
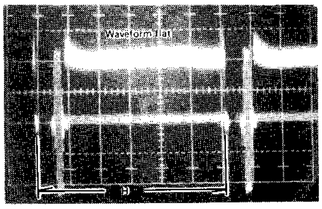
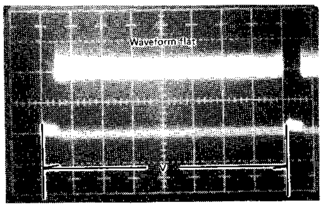
1. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
				RVM4-3, 4-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM4-3 and RVM4-4 so that the waveform is as flat as possible. 
19.	White balance readjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
20.	De-γ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal. ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RVM12, 16 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave.
				RV11, 15 Video board	Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform.
				RV10, 14 Video board	Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the top of the staircase waveform. 

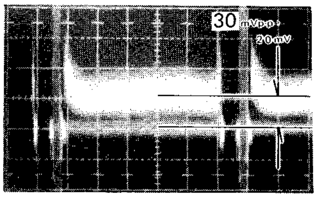
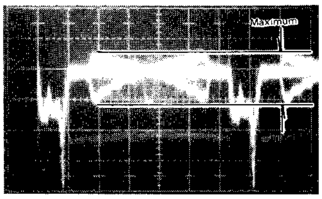
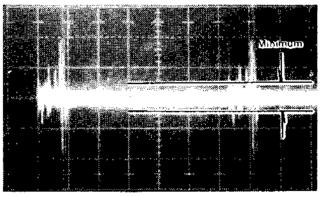
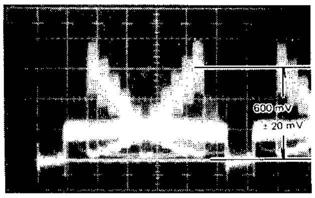
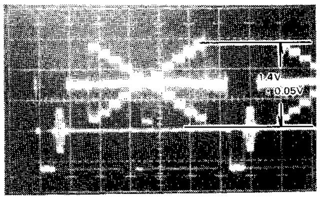
I. Adjustment camera tube/coil ass'y

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
21.	Chroma gain/burst level adjustment	RV24 To adjust the ratio of the color saturation with red and blue color. ● Red or blue color gets less dense. ● Color gets too dense and color noise becomes conspicuous. RV26 To match the color saturation. ● Color gets less dense. Or, it gets too dense and color noise becomes conspicuous. RV4 To adjust the burst level. ● Not colored or color gets too dense.	TP3 Video board	Iris control at side of camera RV24 Video board RV26 Video board RV4 Video board	Shoot the color bar chart. Adjust the white level of the color bar using the iris control to set to 1.2 Vp-p. Adjust the red carrier level is 0.96Vp-p. Adjust the yellow carrier level of the waveform using RV26 to set to 0.48 Vp-p±0.04V. When red carrier level is not set to 0.96 ±0.04Vp-p after this setting readjust RV24. Adjust the burst level of the waveform using RV4 to set to 0.6 Vp-p ± 0.02V. Return the iris control to its click position. 
22.	Red phase adjustment	RV21 To match the red phase. ● The red phase does not match the object.	TV screen	RV21 Video board	Shoot the color bar chart. Adjust tint using RV21 so that tints of the chart and the TV picture match.
23.	Smear adjustment	CV501 To correct frequency response of the preamplifier. ● Green or magenta smear occurs on the right side of bright white sections.	TV screen	CV501 Preamplifier board	Perform this adjustment only when color smear occurs. When smear is adjusted, readjust the chroma carrier level, black balance, white balance and degamma. Shoot the gray scale chart so that it fills the TV screen. Adjust color smear using CV501 so that color smear is not present on the right white section of the gray scale of the TV screen.

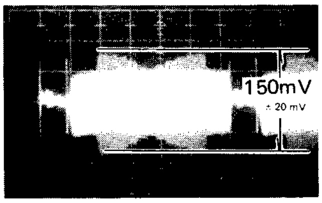
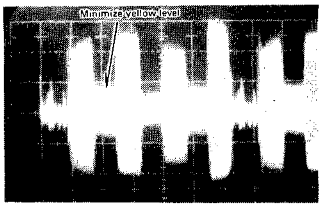
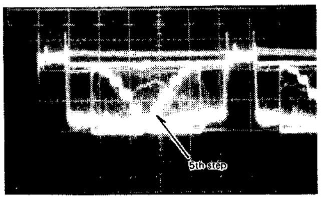
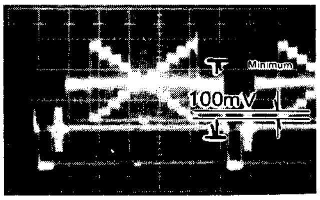
2. Adjustment video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Sub-carrier frequency adjustment	CV251 To adjust the oscillation frequency of the sync generator. ● Color ficker, no color or tint drifts or different color appears.	TV16 Video board	CV251 Video board	Adjust CV251 so that the frequency counter indicates 4.433619 MHz ± 100 Hz.
2.	PLL adjustment	LV251 To adjust to provide the interleaved relation between the horizontal sync signal and sub-carrier signal. ● Picture fluctuated, sync distorted, no color, tint greatly drift, color beats.	TP251 SSG board	LV251 SSG board	Adjust LV251 so that the DC voltmeter indicates 3.0V ± 0.1V.
3.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible. 
4.	Dark shading	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance unevenness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board	Fit the lens cap. Preadjust RV6 so that the setup level is 30～60mVp-p
				RVM2-1, 2-2 Deflection board	Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 
				RVM2-3, 2-4 Deflection board	Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
5.	Y setup adjustment	RV6 To adjust setup of the luminance signal. ● Picture becomes whitish or seems sunk.	TP3 Video board	RV6 Video board	Fit the lens cap. Adjust setup using RV6 to set to 30 mVp-p ±20 mV.

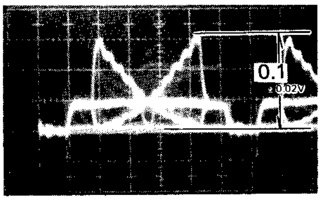
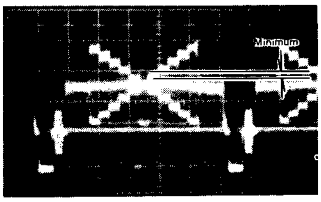
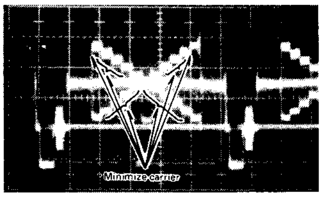
2. Adjustment video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
6.	Edge balance adjustment	RV27, 29 To adjust so that only the vertical edge signal is mixed with the luminance signal. ● The whole screen becomes red or green.	TP17 Video board	RV27 Video board	Shoot the gray scale chart. Adjust RV27 to maximize the waveform. 
			TP18 Video board	RV29 Video board	Adjust RV29 to minimize the waveform. 
7.	Video level adjustment	RV324 To set the balance point of the automatic iris control to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated. RV2 To set the balance point of the AGC circuit to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP1 Video board	RV324 Deflection board	Shoot the gray scale chart. Set the probe to 1:1 and connect to TP1 via a resistor. Adjust the video signal component of the waveform using RV324 and set it to 600 mVp-p ± 20 mV. 
			TP3 Video board	RV2 Video board	Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05V. 

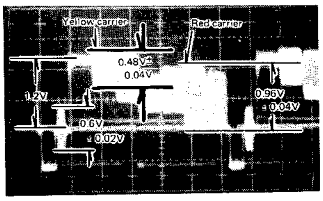
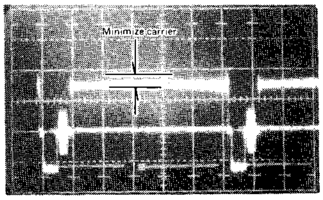
2. Adjustment video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
8.	Chroma carrier level adjustment	To adjust the carrier level of the chroma signal. ● No color, tint abnormal.	TP5 Video board	RV3 Video board	Shoot the gray scale chart. Adjust RV3 to set to 150 mVp-p ± 20 mV. 
9.	Color separation adjustment	RV7 To adjust the carrier phase shift with the R/B separation circuit. ● Color reproduction faulty. Mixed color. RV8 To adjust the 1H delayed carrier level of the chroma signal and match it with the chroma signal carrier level of the phase shifter output. ● Color saturation and purity are deteriorated causing mixing of colors.	TP7 Video board	RV7, 8 Chroma board	Shoot the color bar chart. Adjust RV7 and RV8 alaternately to minimize yellow level of the waveform.  Note: For easy observation, rotate RV17 a little clockwise. After the chroma separation adjustment, set RV17 to the initial position. (Adjust white balance.)
10.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the brightness of the object. RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow. RV23 To adjust setup of the R signal. ● The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. ● The dark portion of the picture becomes discolored.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear. 
			TP3 Video board	RV22, 23 Video board	Adjust the iris control so that output level becames minimum (100 mVp-p approx.) Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase wave. Adjust the iris control to the mid-position. 
			Pin 6 of IC3 Video board	RV30 Video board	Adjust RV30 so that the staircase wave level from the pedestal is 0.1 Vp-p ± 0.02V.

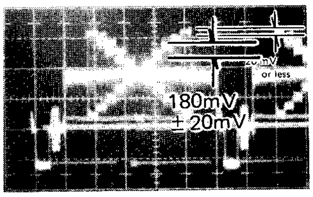
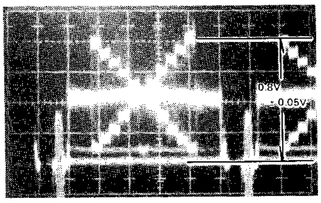
2. Adjustment video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
11.	White balance adjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
12.	De-γ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal. ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RV12, 16 Video board RV11, 15 Video board RV10, 14 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave. Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform. Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the top of the staircase waveform. 
13.	Vertical false signal elimination adjustment	RV28 To decrease the amount of the Vertical false signal. ● Vertical false becomes conspicuous.	TV screen	RV28 Video board	Shoot the gray scale chart. Adjust RV28 so that the vertical false signal on the bottom of gray scale on the TV screen is minimized.
14.	Chroma gain/burst level adjustment	RV24 To adjust the ratio of the color saturation with red and blue color. ● Red or blue color gets less dense. ● Color gets too dense and color noise becomes conspicuous.	TP3 Video board	Iris control at side of camera RV24 Video board	Shoot the color bar chart. Adjust the white level of the color bar using the iris control to set to 1.2 Vp-p. Adjust the red carrier level is 0.96Vp-p.

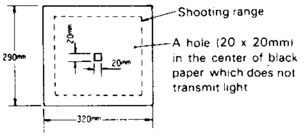
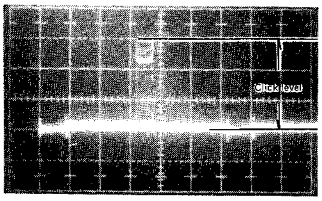
2. Adjustment video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		RV26 To match the color saturation. ● Color gets less dense. Or it gets too dense and color noise becomes conspicuous.		RV26 Video board RV4 Video board	Adjust the yellow carrier level of the waveform using RV26 to set to 0.48 Vp-p 0.04V. When red carrier level is not set to 0.96±0.04Vp-p after this setting readjust RV24. Adjust the burst level of the waveform using RV4 to set to 0.6 Vp-p ± 0.02V. Return the iris control to its click position. 
15.	Red phase adjustment	RV21 To match the red phase. ● The red phase does not match the object.	TV screen	RV21 Video board	Shoot the color bar chart. Adjust tint using RV21 so that tints of the chart and the TV picture match.
16.	Auto white preset adjustment	RV201 To adjust the balance of R and YL signal during auto white set. ● Picture becomes reddish or greenish. RV202 To adjust the balance of B and YL signals during auto white set. ● Picture becomes bluish or greenish.	TP12, 14 Video board	RV201, 202 Auto white board	Shoot the white chart. Zoom: TELEPHOTO White balance: SET Confirm that same level appears at both video period and blanking period, by checking TP12. When video level is lower than blanking, rotate RV201 clockwise, and when video level is higher, rotate it counterclockwise. Set white balance again. Repeat the procedure 3) and 4) until the same level of video and blanking is obtained at TP12. Connect the oscilloscope to TP14 and adjust RV202 so that both video level and blanking level are same, by taking same procedures of 3) to 5). 

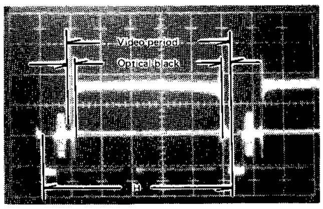
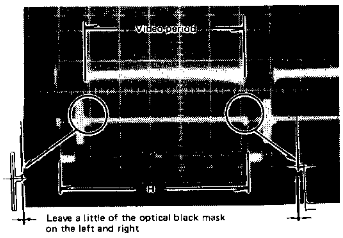
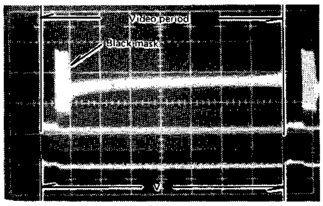
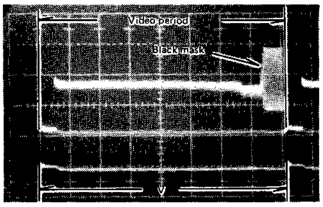
2. Adjustment video circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
17.	Chroma killer adjustment	RV25 To adjust the level so that the chroma is killed at the high-light portion which is higher than the prescribed level. ● The high-light portion becomes green. ● No color.	TP3 Video board	Iris control at side of camera RV25 Video board	Shoot the gray scale chart. Shoot the gray scale chart. Set the indoor/outdoor switch to "INDOOR". Set white balance. Set the indoor/control switch to "OUTDOOR". Adjust RV25 so that the carrier level at the 9th steps of the staircase waveform is 180mVp-p ±20mV. Return the iris control to iris lock position and the indoor/outdoor to INDOOR position. 
18.	Negative video color phase adjustment	RV20 To adjust the color phase when the negative/positive switch is placed into "NEG". ● Color phase of the negative video differs.	TV screen	RV20 Video board	Shoot the color bar chart. Negative/positive: NEG Adjust RV20 so that the tint at the right end section of the color bar of the TV screen match to the tint at yellow of the color bar chart.
19.	Low light warning indicator level adjustment	RV323. To set the level of the low light warning display. ● The graphics "LIGHT LOW" are not displayed when the video signal decreases. The graphics "LIGHT OK" are not displayed when the video signal increases.	TP3 Video board	RV324 Deflection board	Shoot the gray scale chart. Display: Check pattern (by pressing the check/normal button) Adjust RV324 so that the video signal is 0.8 Vp-p ± 0.05V.
				RV323 Deflection board	Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW". 

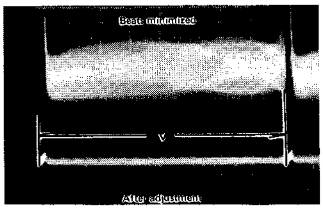
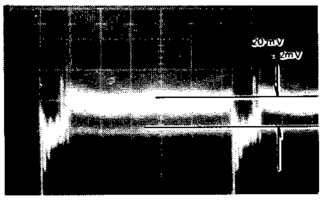
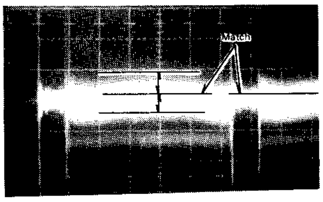
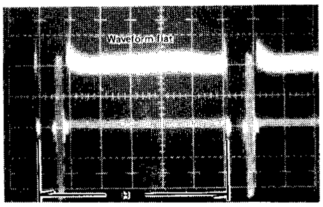
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Power voltage adjustment	RV451, 452, 453, 454 To set the power voltages. ● Picture becomes abnormal. Microprocessor malfanctions.	TP306 Deflection board	RV451 Deflection board	Adjust RV451 so that the DC voltmeter indicates 9.0V ± 0.01V.
			TP308 Deflection board	RV452 Deflection board	Adjust RV452 so that the DC voltmeter indicates 5.0V ± 0.01V.
			TP307 Deflection board	RV453 Deflection board	Adjust RV453 so that the DC voltmeter indicates 5.0V ± 0.01V.
			TP309 Deflection board	RV454 Deflection board	Adjust RV454 so that the DC voltmeter indicates 5.1V ± 0.01V.
2.	Beam voltage adjustment	RV302, 326 To adjust electron beam amount of SATICON by varying G1 voltage. ● When the voltage is too low: The high bright (white) sections of the gray scale cannot be discriminated. When the voltage is lowered further, picture does not appear. ● When the voltage is too high: Magenta ghost appears to the right side of the high bright (white) section of the gray scale. Or, horizontal green color appears in that section. Shading amount increases.	TV screen	LV301, RV303 ~ 306 Deflection board	Shoot the test chart A. Adjust LV301, RV303 ~ 306 when the circle of the chart is not round. This adjustment is not required when the circle is approximately round. Adjust the following: RV304: Horizontal centering LV301 : Horizontal size (wide) RV303: Horizontal linearity RV306: Vertical centering RV305: Vertical size (height)
			TP1 Video board	RV302 Deflection board	Turn RV326 fully counterclockwise. Shoot the chart shown in the diagram. 1 Shooting range 2 Provide a hole (20 x 20 mm) at the center of a black paper which does not transmit light.  Shooting range A hole (20 x 20mm) in the center of black paper which does not transmit light 20mm 20mm 290mm 320mm Adjust the clip level of the waveform using RV302 and set it to 1.5 Vp-p ± 0.05V. 
				RV326 Deflection board	Adjust RV326 so that the clip level of the beam is 2.4 Vp-p ± 0.1V.
3.	Horizontal size/linearity/ centering adjustment	LV301 To adjust horizontal deflection size. ● The circle chart is distorted. Color balance is not obtained but changes to green.	TP3 Video board	LV301 Deflection board	Shoot white chart. Zoom: TELEPHOTO Adjust LV301 to shorten the waveform width.

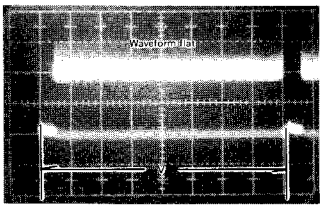
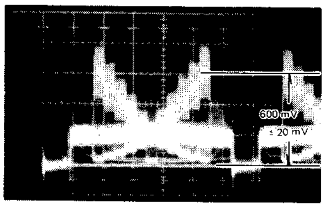
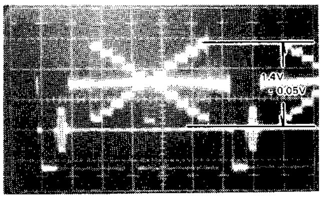
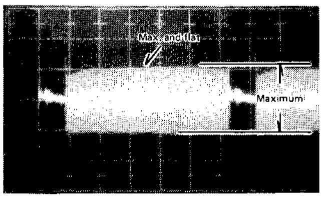
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		● Color beat increases.		RV304 Deflection board	 Adjust RV304 so that the optical black mask is symmetrical on the left and right.
		RV304 To adjust horizontal deflection position.	TV screen	RV303 Deflection board	Shoot the test chart A. Adjust RV303 so that the circle on left and right.
		● Black mask appears on the left or right of the screen. RV303 To adjust horizontal deflection linearity. ● The circle chart is distorted. Color unevenness appears on the left or right. ● Color beat increases. Note: When the above adjustment is not performed properly, best and shading may occur.	TP3 Video board	LV301 (RV304)	Shoot the white chart. Zoom: TELEPHOTO Adjust LV301 so that a little optical black mask remains on the left and right. Fine adjust RV304 so that the optical black mask is symmetrical on the left and right. 
4.	Vertical size/centering adjustment	RV305 To adjust vertical deflection size. ● The circle chart is distorted (becomes an elipse). RV306 To adjust vertical deflection centering. ● The circle chart is distorted. Green mask appears at the top or bottom of the screen.	TP3 Video board	RV305 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the oscilloscope to the V period. Adjust RV305 to shorten the waveform width and make the black mask appear on the left and right.  

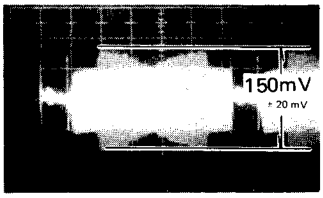
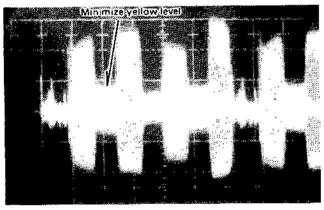
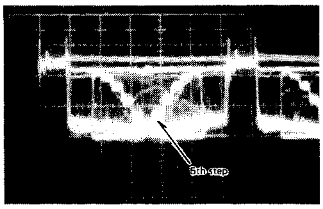
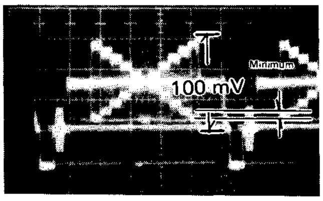
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
				RV306 Deflection board.	Adjust RV306 so the black mask is symmetrical on the left and right.
			TP1 Video board	RV305 (RV306)	Adjust RV305 to minimize waveform. beats. Fine adjust RV306 so that the black mask is symmetrical on the left and right. 
5.	Bias light adjustment	RV325 To adjust bias light potential. ● When the voltage is too low, residual image increases under lower illumination. ● When the voltage is too high, shadingamount increases.	TP1 Video board	RV325 Deflection board	Fit the lens cap. Set the probe to 1 : 1 and connect to TP1 via a resistor. Adjust the level nearer to the center using RV325 so that it is 20 mVp-p ± 2 mV. 
6.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible. 
7.	Dark shading adjustment	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance unevenness at the dark portion. ● Luminance unevenness appears.	TP3 Video board	RV6 Video board RVM2-1, 2-2 Deflection board	Fit the lens cap. Preadjust RV6 so that the setup level is 30~60 mVp-p. Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 

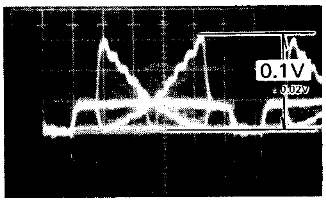
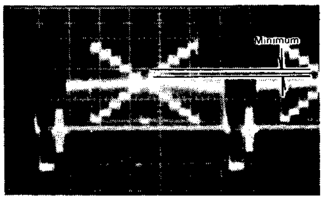
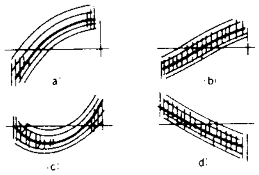
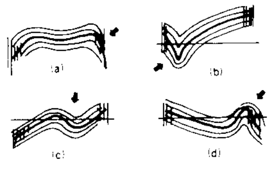
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
				RVM2-3, 2-4 Deflection board	Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
8.	Video level adjustment	RV324 To set the balance point of the automatic iris control to keep the video output level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated. RV2 To settle balance point of the AGC circuit to keep the video level constant. ● Illumination is sufficient but the picture is too dark or the picture is too bright and bright sections are saturated.	TP1 Video board	RV324 Deflection board	Shoot the gray scale chart. **Set the probe to 1:1 and connect to TP1 via a resistor.** Adjust the video signal component of the waveform using RV324 and set it to 600 mVp-p ± 20 mV. 
			TP3 Video board	RV2 Video board	Adjust RV2 so that the video signal component of the waveform is 1.4 Vp-p ± 0.05V. 
9.	Field focus adjustment	RV301 To adjust the focus electrode voltage of the SATICON so that the electron beam output from the cathode is focused on the photoconductive film. ● Focus is not obtained when the focus ring or the focus adjusting screw of the lens is turned. ● Picture becomes greenish.	TP301 Deflection board TP302 ~ TP305 Deflection board	RVM1-1, 1-2, 1-3, 1-4 Deflection board	Short between TP302 and TP303 and between TP303 and TP304. Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
			TP5 Video board	RV301 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Adjust RV301 so the carrier level is max. and flat without peaks and troughs. 

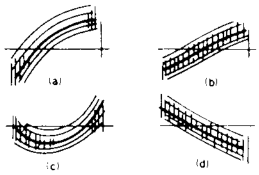
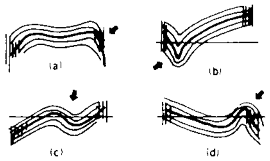
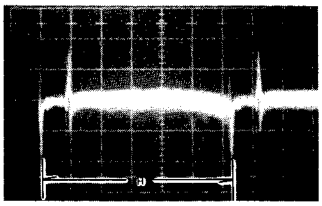
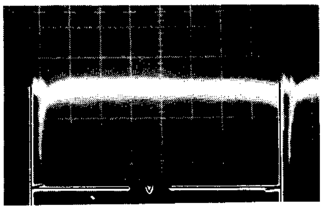
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
10.	Chroma carrier level adjustment	RV3 To adjust the carrier level of the chroma signal. ● No color, tint abnormal.	TP5 Video board	RV3 Video board	Shoot the gray scale chart. Adjust RV3 to set to 150 mVp-p ± 20 mV. 
11.	Color separation adjustment	RV7 To adjust the carrier phase shift with the R/B separation circuit. ● Color reproduction faulty. Mixed color. RV8 To adjust the 1H delayed carrier level of the chroma signal and match it with the chroma signal carrier level of the phase shifter output. ● Color saturation and purity are deteriorated causing mixing of colors.	TP7 Video board	RV7, 8 Video board	Shoot the color bar chart. Adjust RV7 and RV8 alternately to minimize yellow level of the waveform.  Note: For easy observation, rotate RV17 a little clockwise. After the chroma separation adjustment, set RV017 to the initial position. (Adjust white balance.)
12.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. ● The white section of the picture is colored depending on the brightness the object. RV22 To adjust setup of the B signal. ● The dark portion of the picture is colored blue or yellow. RV23 To adjust setup of the R signal. ● The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. ● The dark portion of the picture becomes discolored.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step or higher from the top of the staircase waveform appear. 
			TP3 Video board	RV22, 23 Video board	Adjust the iris control so that output level becames minimum (100 mVp-p approx.) Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase waveform. Adjust the iris control to the mid-position. 
			Pin 6 of IC3	RV30 Video board	Adjust RV30 so that the level from the pedestal staircase waveform is 0.1 Vp-p ± 0.02V.

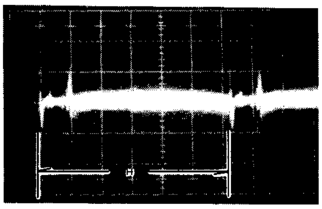
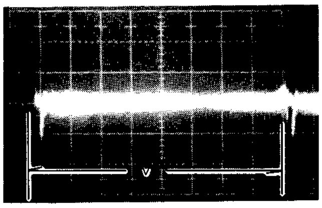
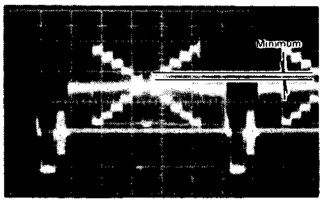
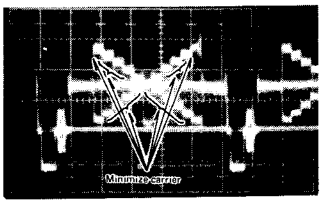
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
13.	White balance adjustment	RV13 To match the YL and R signal lelves and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
14.	Dynamic focus adjustment	RVM1-1, 1-2, 1-3, 1-4 To correct the peripheral beam focusing of the SATICON. To adjust the amount of dynamic focus. ● Color unevenness increases.	TP302 ~ TP305 Deflection board TP12 Video board TP14 Video board	RVM1-1, 1-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Short between TP302 and TP303 and between TP304 and TP305. Set the input range of both channels of the oscilloscope to 10 mV/div (prove: 10 : 1) and set to the DUAL mode. Adjust the waveform using RVM1-1 and RVM1-2 so that it is easy to correct shading.  Waveform making it easy to correct shading.  ← : Section with correction not applied Waveform making it difficult to correct shading.
				RVM1-3, 1-4, RV301 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM1-3, RVM1-4 and RV301 so that it is easy to correct shading.

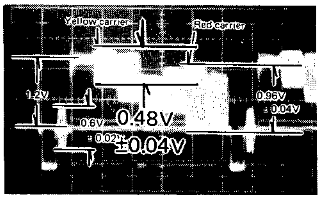
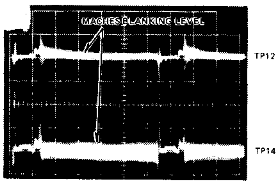
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 Waveform making it easy to correct shading.  ⬅ : Section with correction not applied Waveform making it difficult to correct shading. Remove short-circuit. * When the waveform easy to correct shading is not obtained by the adjustment shown above, adjust the field focus in item 9, and then perform adjustment shown in item 14 gain.
15.	Red/ modulation shading adjustment	RVM3-1, 3-2, 3-3, 3-4 To correct R signal color unevenness. ● Color unevenness increases.	TP12 Video board	RVM3-1, 3-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM3-1 and RVM3-2 so that the waveform it as flat as possible. 
				RVM3-3, 3-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM3-3 and RVM3-4 so that the waveform is as flat as possible. 
16.	Blue/ modulation shading adjustment	RVM4-1, 4-2, 4-3, 4-4 To correct B signal color unevenness. ● Color unevenness increases.	TP12 Video board	RVM4-1, 4-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1).

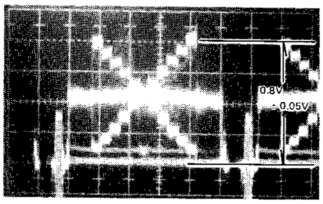
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					Adjust the waveform using RVM4-1 and RVM4-2 so that the waveform is as flat as possible. 
				RVM4-3, 4-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM4-3 and RVM4-4 so that the waveform is as flat as possible. 
17.	White balance readjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. ● White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. ● White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
18.	Deγ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal. ● The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. ● The white section is colored depending on the brightness of the object.	TP3 Video board	RV12, 16 Video board RV11, 15 Video board RV10, 14 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave. Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform. Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the top of the staircase waveform. 

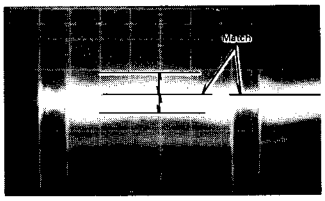
3. Adjustment deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
19.	Chroma gain/burst level adjustment	RV24 To adjust the ratio of the color saturation with red and blue color. ● Red or blue color gets less dense. ● Color gets too dense and color noise becomes conspicuous. RV26 To match the color saturation. ● Color gets less dense. Or it gets too dense and color noise becomes conspicuous. RV4 To adjust the burst level. ● Not colored or color gets too dense.	TP3 Video board	Iris control at side of camera RV24 Video board RV26 Video board RV4 Video board	Shoot the color bar chart. Adjust the white level of the color bar using the iris control to set to 1.2Vp-p. Adjust the red carrier level is 0.96Vp-p. Adjust the yellow carrier level of the waveform using RV26 to set to 0.48 Vp-p ±0.04V. When red carrier level is not set to 0.96 ±0.04 Vp-p after this setting readjust RV24. Adjust the burst level of the waveform using RV4 to set to 0.6 Vp-p ± 0.02V. Return the iris control to its click position. 
20.	Red phase	RV21 adjustment ● The red phase does not match the object.	TV screen	RV21 Video board	Shoot the color bar chart. Adjust tint using RV21 so that tints of the chart and the TV picture match.
21.	Auto white preset adjustment	RV201 To adjust the balance of R and YL signals during auto white set. ● Picture becomes reddish or greenish. RV202 To adjust the balance of B and YL signals during auto white set. ● Picture becomes bluish or greenish.	TP12, 14 Video board	RV201, 202 Auto white board	Shoot the white chart. Zoom: TELEPHOTO White balance: SET Confirm that same level appears at both video period and blanking period, by checking TP12. When video level is lower than blanking, rotate RV201 clockwise, and when video level is higher, rotate it counterclockwise. Set white balance again. Repeat the procedure 3) and 4) until the same level of video and blanking is obtained at TP12. Connect the oscilloscope to TP14 and adjust RV202 so that both video level and blanking level are same, by taking same procedures of 3) to 5). 

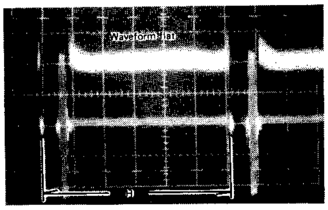
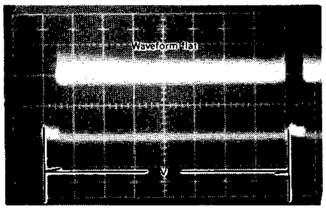
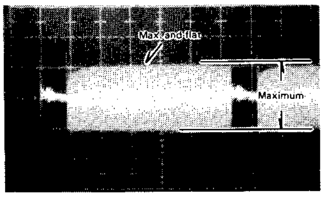
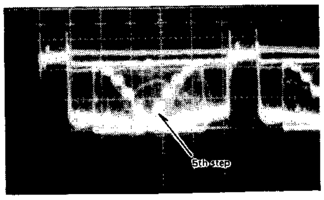
3. Adjustment after replacing deflection circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
22.	Low light warning indicator level adjustment	RV323 To set the level of the low light warning display. ● The graphics "LIGHT LOW" are not displayed when the video signal decreases. The graphics "LIGHT OK" are not displayed when the video signal increases.	TP3 Video board	RV324 Deflection board	Shoot the gray scale chart. Display: Check pattern (by pressing the check/normal button) Adjust RV324 so that the video signal is 0.8 Vp-p ± 0.05V.
				RV323 Deflection board	Adjust RV323 so that the display changes to "LIGHT OK" from "LIGHT LOW". 

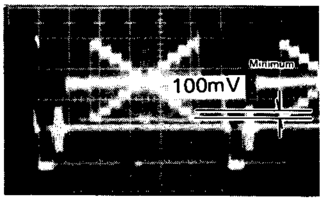
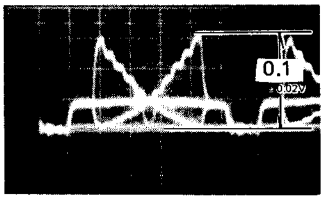
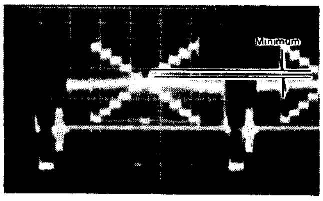
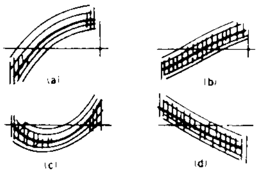
4. Adjustment preamplifier circuit board

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Pulse canceller adjustment	RV1 To adjust so that the setup does not change when the iris control is varied. ● The whole picture changes to red or green.	TP2 Video board	RV1 Video board	Fit the lens cap. Adjust RV1 so that the center of both the video period and the blanking period match as much as possible. 
2.	Smear adjustment	CV501 To correct frequency response of the preamplifier. ● Green or magenta smear occurs on the right side of bright white sections.	TV screen	CV501 Preamplifier board	Perform this adjustment only when color smear occurs. When smear is adjusted, readjust the chroma carrier level, black balance, white balance and degamma. Shoot the gray scale cahrt so that it fills athe TV screen. Adjust color smear using CV501 so that color smear is not present on the right white section of the gray scale of the TV screen.

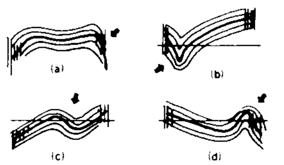
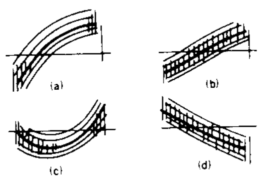
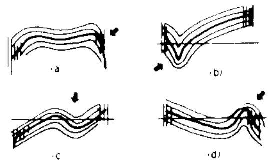
5. Faulty shading adjustment

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
1.	Dark shading adjustment	RVM2-1, 2-2, 2-3, 2-4 To correct the luminance unevenness at the dark portion. - Luminance unevenness appears.	TP3 Video board	RV6 Video board	Fit the lens cap. Preadjust RV6 so that the setup level is 30∼60 mVp-p.
				PVM2-1, 2-2 Deflection board	Adjust RVM2-1 and RVM2-2 so that the waveform is as flat as possible. 
				RVM2-3, 2-4 Deflection board	Set an oscilloscope to the V period. Adjust RVM2-3 and RVM2-4 so that the waveform is as flat as possible. 
2.	Field focus adjustment	PV301 To adjust the focus electrode voltage of the SATICON so that the electron beam output from the cathode is focused on the photoconductive film. - Focus is not obtained when the focus ring or the focus adjusting screw of the lens is turned. - Picture becomes greenish.	TP301 Deflection board TP3-2 ~ TP305 Deflection board	RVM1-1, 1-2, 1-3, 1-4 Deflection board	Short between TP302 and TP303 and between TP304 and TP305. Preadjust RVM1-1 ~ RVM1-4 so that the waveform is minimized.
			TP5 Video board	RV301 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Adjust RV301 so the carrier level is max. and flat without peaks and troughs. 
3.	Black balance adjustment	RV5 To adjust the clip level of the degamma correction signal. - The white section of the picture is colored depending on the brightness of the object RV22 To adjust setup of the B signal. - The dark portion of the picture is colored blue or yellow.	TP8 Video board	RV5 Video board	Shoot the gray scale chart. Adjust RV5 so that the 5th step from the too of the staircase waveform appear. 

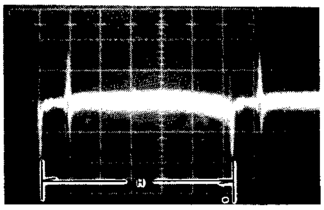
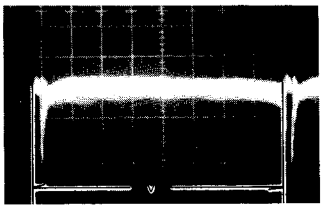
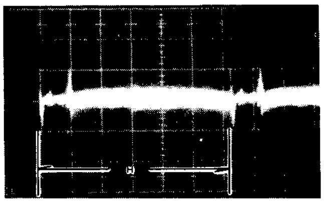
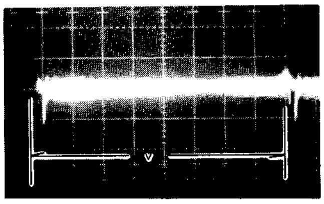
5. Faulty shading adjustment

Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		RV23 To adjust setup of the R signal. • The dark portion of the picture is colored green or magenta. RV30 To cut the dark portion of the YL signal so that the dark portion of the picture is not colored. • The dark portion of the picture becomes discolored.	TP3 Video board	RV22, 23 Video board	Adjust the iris control so that output level becames minimum (100 mVp-p approx.) Adjust RV22 and RV23 alternately to minimize the carrier at the 1st step from the bottom of the staircase wave. Adjust the iris control to the mid-position. 
			Pin 6 of IC3	RV30 Video board	Adjust RV30 so that the staircase wave level from the pedestal is 0.1V Vp-p ± 0.02V. 
4.	White balance adjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. • White balance is not obtained. RV17 To match the YL and B signal levels and adjust so that white balance is obtained. • White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave. 
5.	Dynamic focus adjustment	RVM1-1, 1-2, 1-3, 1-4 To correct the periopheral beam focusing of the SATICON. To adjust the amount of dynamic focus. • Color unevenness increases.	TP302 TP305 Deflection board TP12 Video board TP14 Video board	RVM1-1, 1-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Short between TP302 and TP303 and between TP304 and TP305. Set the input range of both channels of the oscilloscope to 10 mV/div (probe: 10 : 1) and set to DUAL mode. Adjust the waveform using RVM1-1 and RVM1-2 so that it is easy to correct shading.  Waveform making it easy to correct shading.

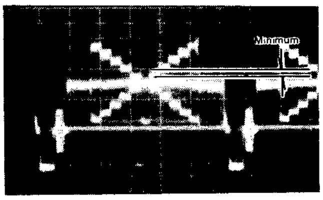
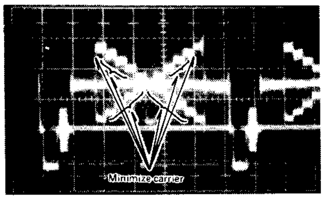
5. Faulty shading adjustment

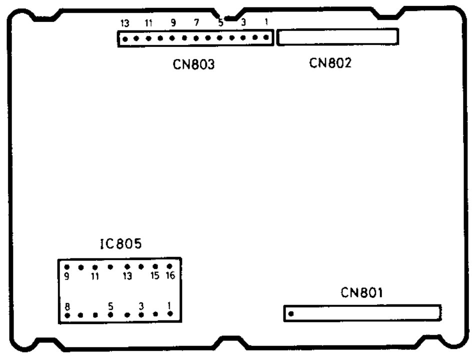
Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					 ←: Section with correction not applied Waveform making it difficult to correct shading.
				RVM1-3, 1-4, RV301 Deflection	Set the oscilloscope to the V period. Adjust the waveform using RVM1-3, RVM1-4 and RV301 so that it is easy to correct shading.  Waveform making it easy to correct shading.  ← Section with correction not applied Waveform making it difficult to correct shading. Remove short-circuit.
					* When the waveform easy to correct shading is not obtained by the adjustment shown above, adjust the field focus in item 2, and then perform adjustment shown in item 5 again.
6.	Red/ modulation shading	RVM3-1, 3-2, 3-3, 3-4 To correct R signal color uneveness.	TP12 Video board	RVM3-1, 3-2 Deflection board.	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM3-1 and RVM3-2 so that the waveform is as flat as possible.

5. Faulty shading adjustment

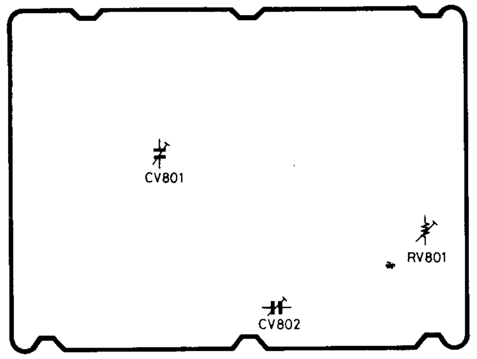
Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
					
				RVM3-3, 3-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM3-3 and RVM3-4 so that the waveform is as flat as possible. 
7.	Blue/ modulation shading adjustment	RVM4-1, 4-2, 4-3, 4-4 To correct B signal color unevenness. • Color uneveness increases.	TP12 Video board	RVM4-1, 4-2 Deflection board	Shoot the white chart. Zoom: TELEPHOTO Set the input range of the oscilloscope to 10 mV/div (probe: 10 : 1). Adjust the waveform using RVM4-1 and RVM4-2 so that the waveform is as flat as possible. 
				RVM4-3, 4-4 Deflection board	Set the oscilloscope to the V period. Adjust the waveform using RVM4-3 and RVM4-4 so that the waveform is as flat as possible. 
8.	White balance readjustment	RV13 To match the YL and R signal levels and adjust so that white balance is obtained. • White balance is not obtained.	TP3 Video board	RV13, 17 Video board	Shoot the gray scale chart. Adjust RV13 and RV17 alternately to minimize the carrier at the 6th and 7th steps from the bottom of the staircase wave.

5. Faulty shading adjustment

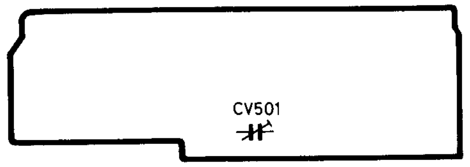
Item No.	Name of adjustment	Purpose of adjustment/ picture phenomena	Test point	Position to be adjusted	Adjustment method & adjustment value
		RV17 To match the YL and 8 signal levels and adjust so that white balance is obtained. • White balance is not obtained.			
9.	De-γ (degamma) adjustment	RV10, 11, 12 To adjust the level and amount of degamma of the R signal • The white section is colored depending on the brightness of the object. RV14, 15, 16 To adjust the level and amount of degamma of the B signal. • The white section is colored depending on the brightness of the object.	TP3 Video board	RV12, 16 Video board RV11, 15 Video board RV10, 14 Video board	Shoot the gray scale chart. Adjust RV12 and RV16 alternately to minimize the carrier at the 1st ~ 5th steps from the bottom of the staircase wave. Adjust RV11 and RV15 alternately to minimize the carrier at the 8th ~ 10th steps from the bottom of the staircase waveform. Adjust RV10 and RV14 alternately to minimize the carrier at the 1st step from the too of the staircase waveform. 


CN803
CN802
IC805
CN801

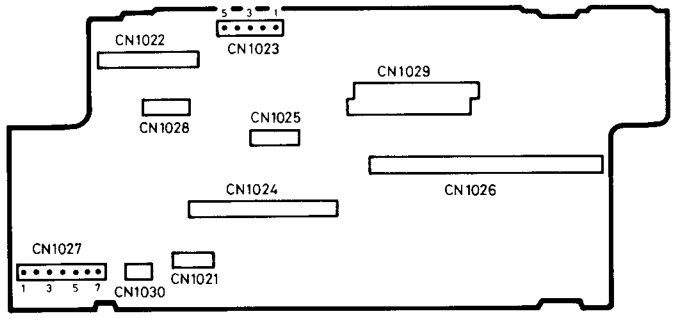
µCOM-1 P.C Board (pattern side)


CV801
RV801
CV802

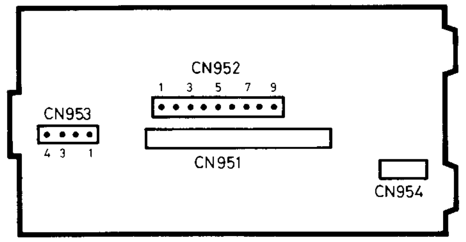
µCOM-1 P.C Board (parts side)



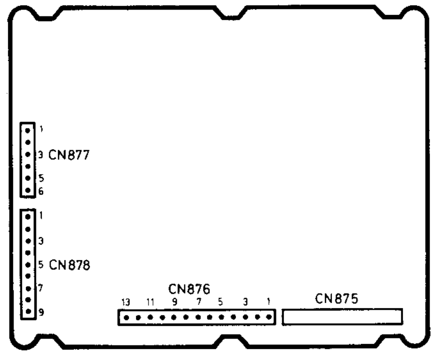
PREAMPLIFIER (PREAMP) P.C Board (parts side)


CN1022
CN1023
CN1029
CN1028
CN1025
CN1024
CN1026
CN1027
CN1030
CN1021

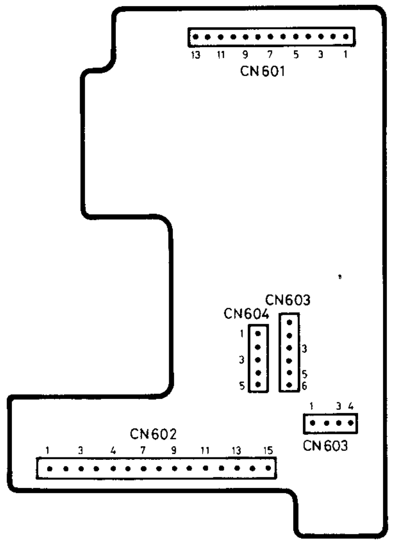
MOTHER P.C Board (parts side)


CN952
CN953
CN951
CN954

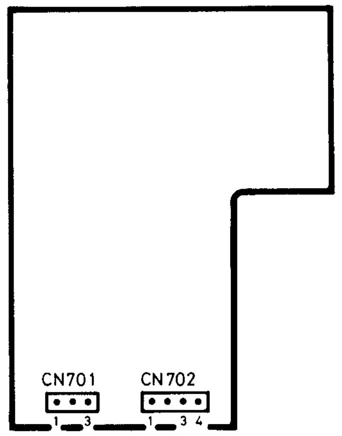
VTR CONTROL (V CON) P.C Board (parts side)


CN877
CN878
CN876
CN875

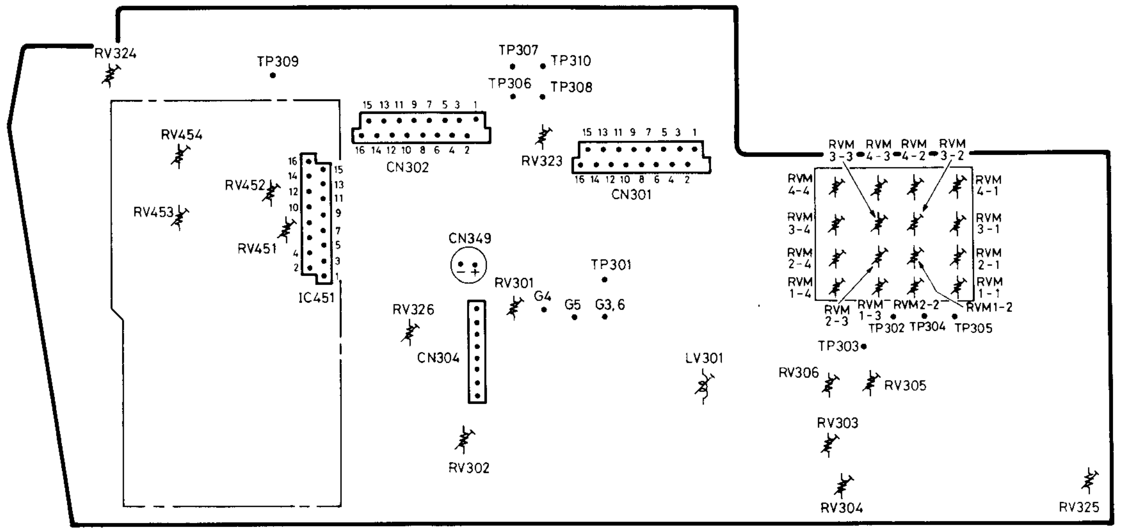
µCOM-2 P.C Board (pattern side)


CN601
CN603
CN604
CN602
CN603

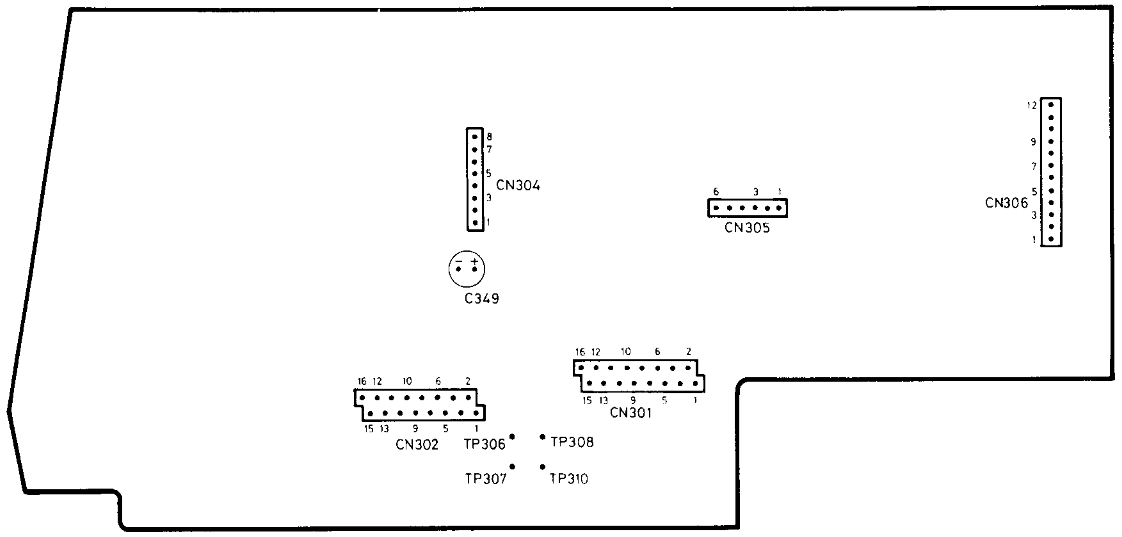
VTR INTERFACE (V INT) P.C Board (parts side)


CN701
CN702

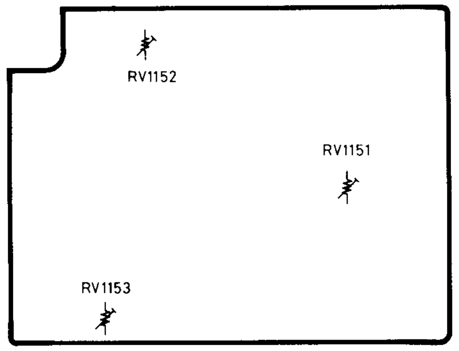
AUDIO P.C Board (parts side)


RV324
TP309
TP307
TP310
TP306
TP308
RV454
CN302
RV323
CN301
RV452
RV453
RV451
IC451
CN349
RV301
TP301
G4
G5
G3, 6
RV326
CN304
RV302
LV301
RVM 3-3
RVM 4-3
RVM 4-2
RVM 3-2
RVM 4-4
RVM 4-1
RVM 3-4
RVM 3-1
RVM 2-4
RVM 2-1
RVM 1-4
RVM 1-1
RVM 2-3
RVM 1-3
RVM 2-2
RVM 1-2
TP302
TP304
TP305
TP303
RV306
RV305
RV303
RV304
RV325

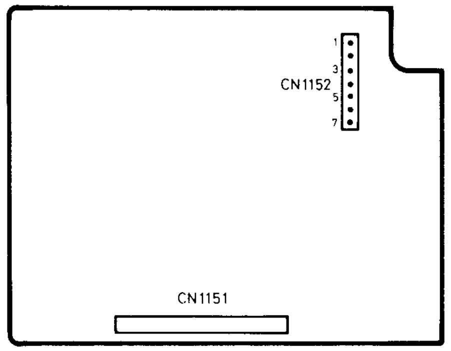
Deflection P.C Board (parts side)


CN304
CN305
CN306
C349
CN301
CN302
TP306
TP308
TP307
TP310

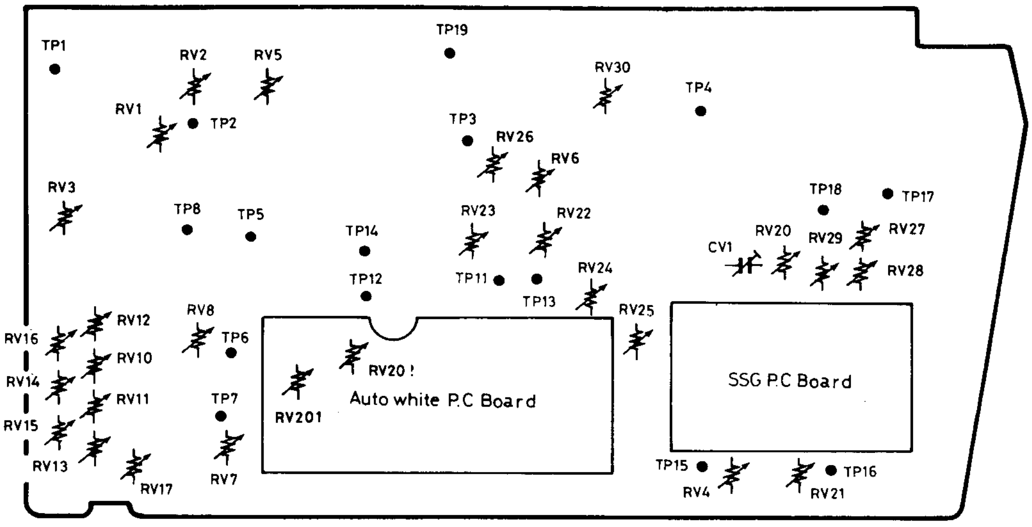
Deflection P.C Board (pattern side)


RV1152
RV1151
RV1153

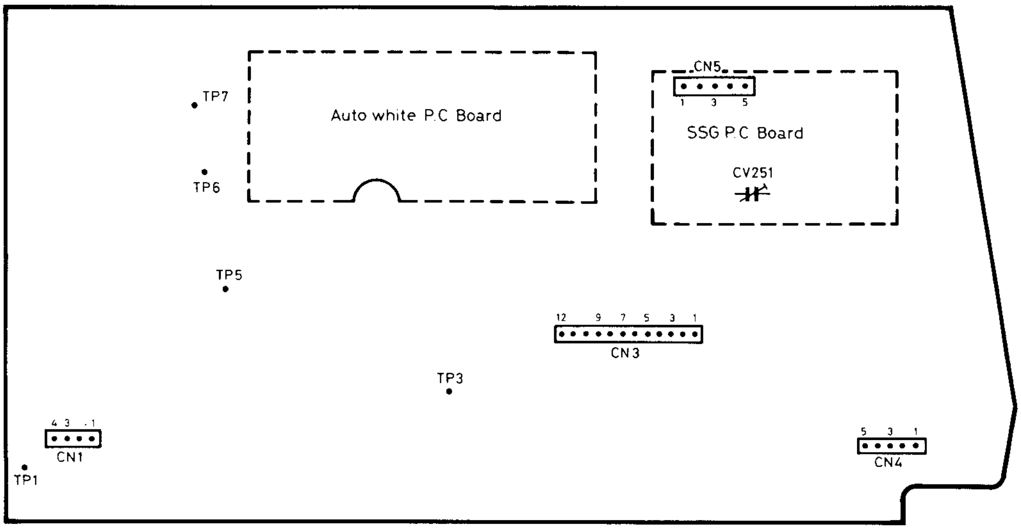
EVF-2 P.C Board (parts side)


CN1152
CN1151

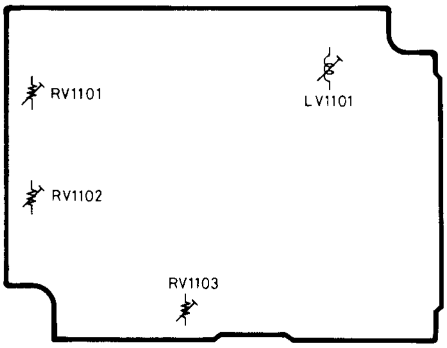
EVF-2 P.C Board (pattern side)


TP1
RV2
RV5
TP19
RV30
TP4
RV1
TP2
TP3
RV26
RV6
RV3
TP8
TP5
TP14
RV23
RV22
TP18
TP17
RV20
RV29
RV27
CV1
RV28
TP12
TP11
TP13
RV24
RV8
RV25
RV16
RV12
TP6
RV10
RV20 !
RV14
RV11
TP7
Auto white P.C Board
RV201
SSG P.C Board
RV15
RV13
RV17
RV7
TP15
RV4
TP16
RV21

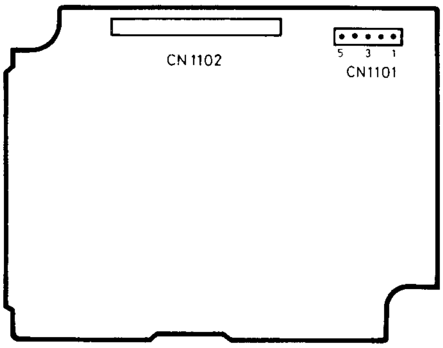
Video P.C Board (parts side)


TP7
Auto white P.C Board
CN5
1 3 5
SSG P.C Board
TP6
CV251
TP5
12 9 7 5 3 1
CN3
TP3
4 3 1
CN1
TP1
5 3 1
CN4

Video P.C Board (pattern side)

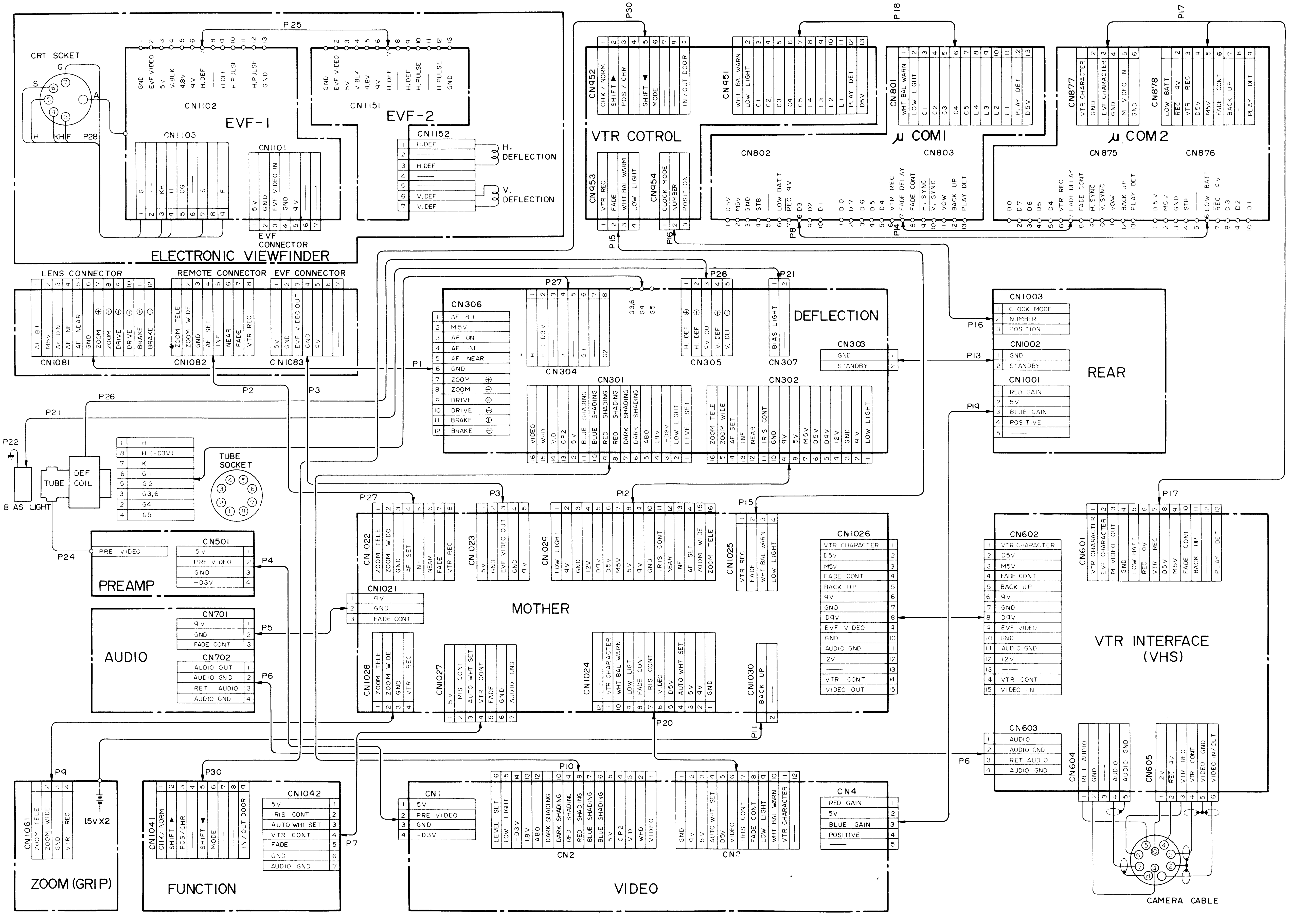

RV1101
LV1101
RV1102
RV1103

EVF-1 P.C Board (parts side)


CN 1102
5 3 1
CN1101

EVF-1 P.C Board (pattern side)

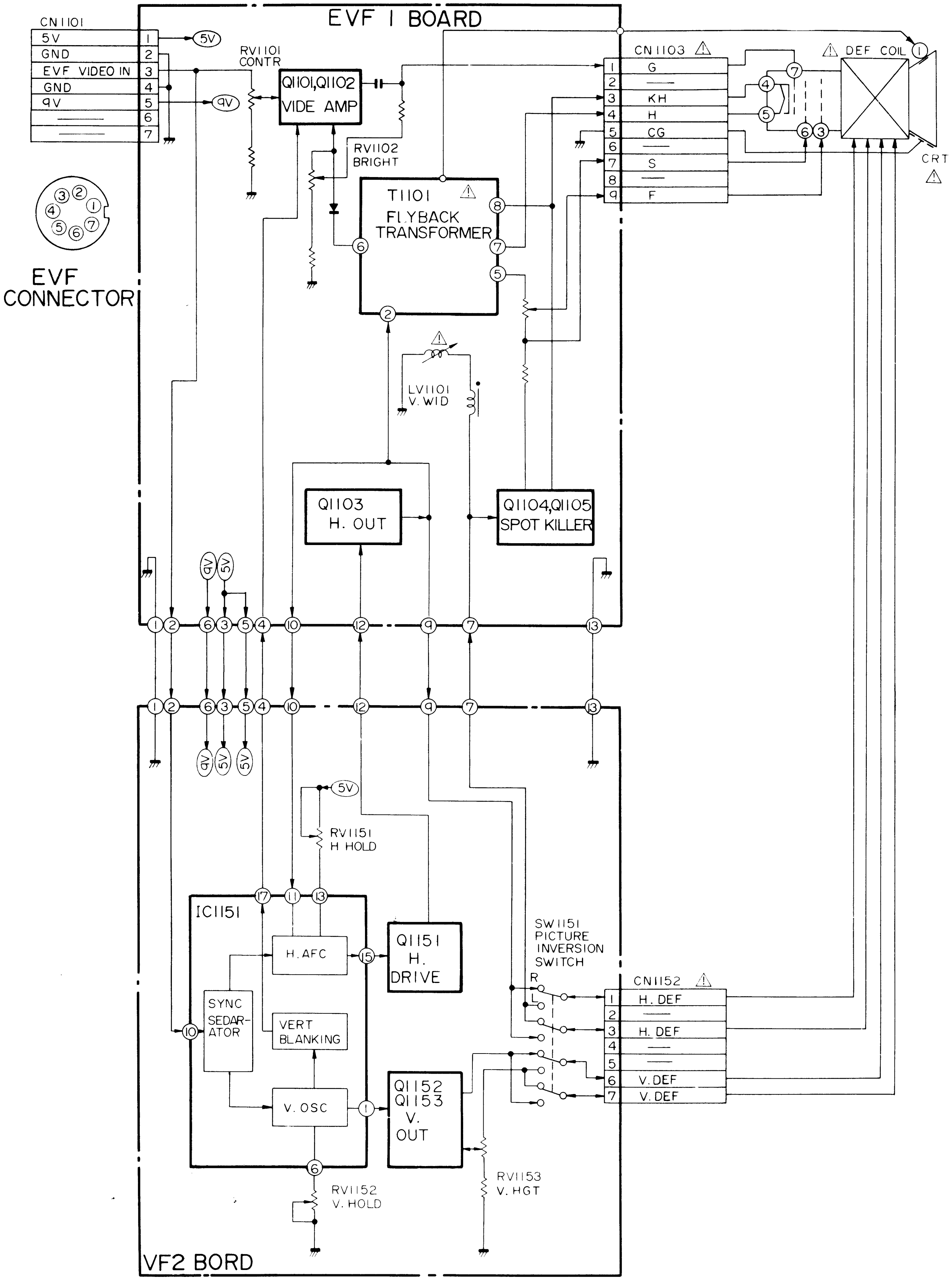
CIRCUIT BOARD CONNECTION DIAGRAM



ELECTRONIC VIEWFINDER
CRT SOKET
EVF-1
EVF-2
CN1102
CN1103
CN1101
CN1151
CN1152
H. DEFLECTION
V. DEFLECTION
EVF CONNECTOR
P25
P28
LENS CONNECTOR
REMOTE CONNECTOR
EVF CONNECTOR
CN1081
CN1082
CN1083
VTR COTROL
CN952
CN951
CN953
CN954
μ COM1
CN801
CN802
CN803
μ COM2
CN877
CN878
CN875
CN876
P30
P18
P17
DEFLECTION
CN306
CN304
CN305
CN307
CN303
CN301
CN302
REAR
CN1003
CN1002
CN1001
TUBE SOCKET
DEF COIL
TUBE
BIAS LIGHT
PREAMP
CN501
AUDIO
CN701
CN702
MOTHER
CN1021
CN1022
CN1023
CN1029
CN1025
CN1026
CN1028
CN1027
CN1024
CN1030
VTR INTERFACE (VHS)
CN602
CN601
CN603
CN604
CN605
CAMERA CABLE
ZOOM (GRIP)
CN1061
1.5V X2
FUNCTION
CN1041
CN1042
VIDEO
CN1
CN2
CN3
CN4
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P19
P20
P21
P22
P24
P26
P27

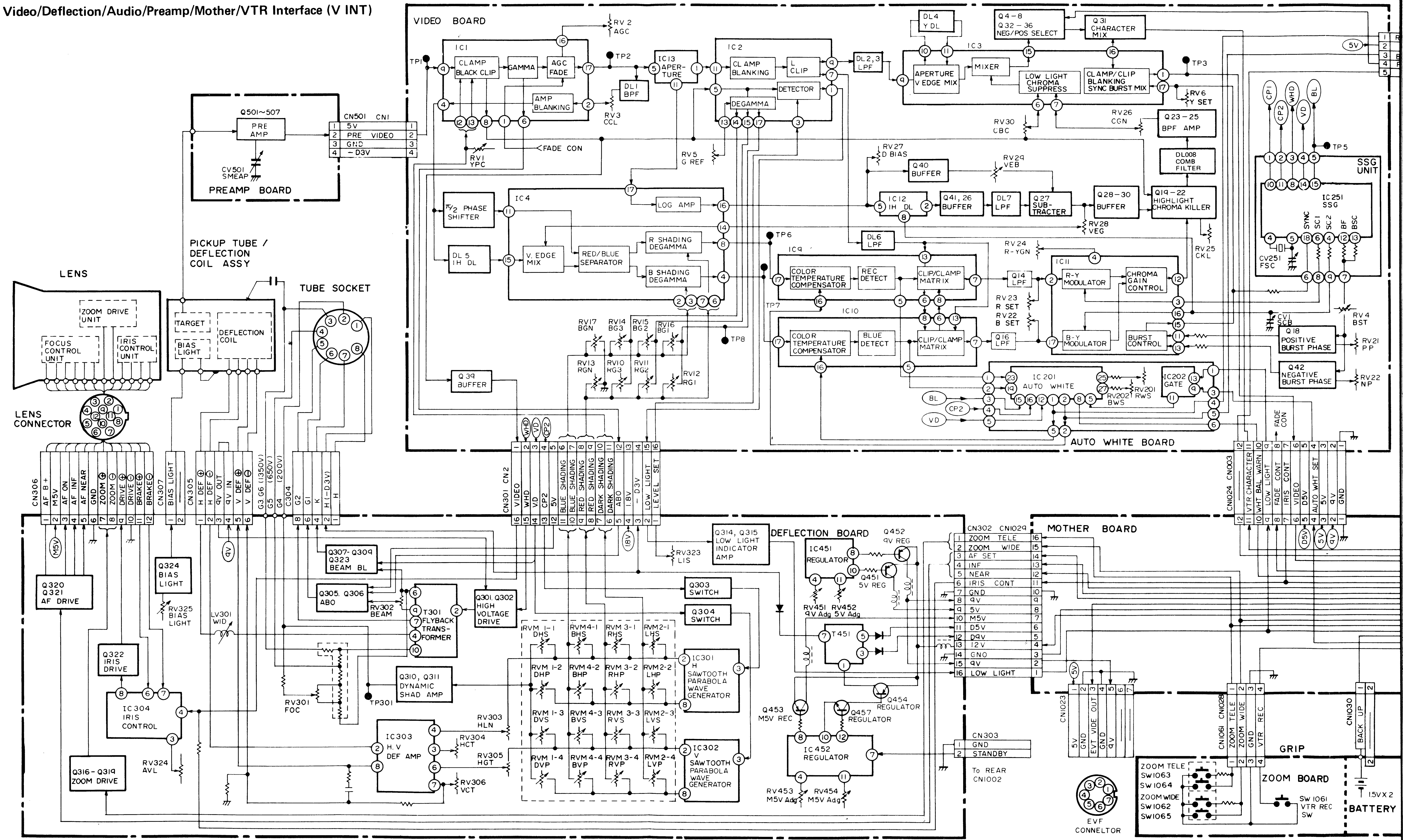
BLOCK DIAGRAM

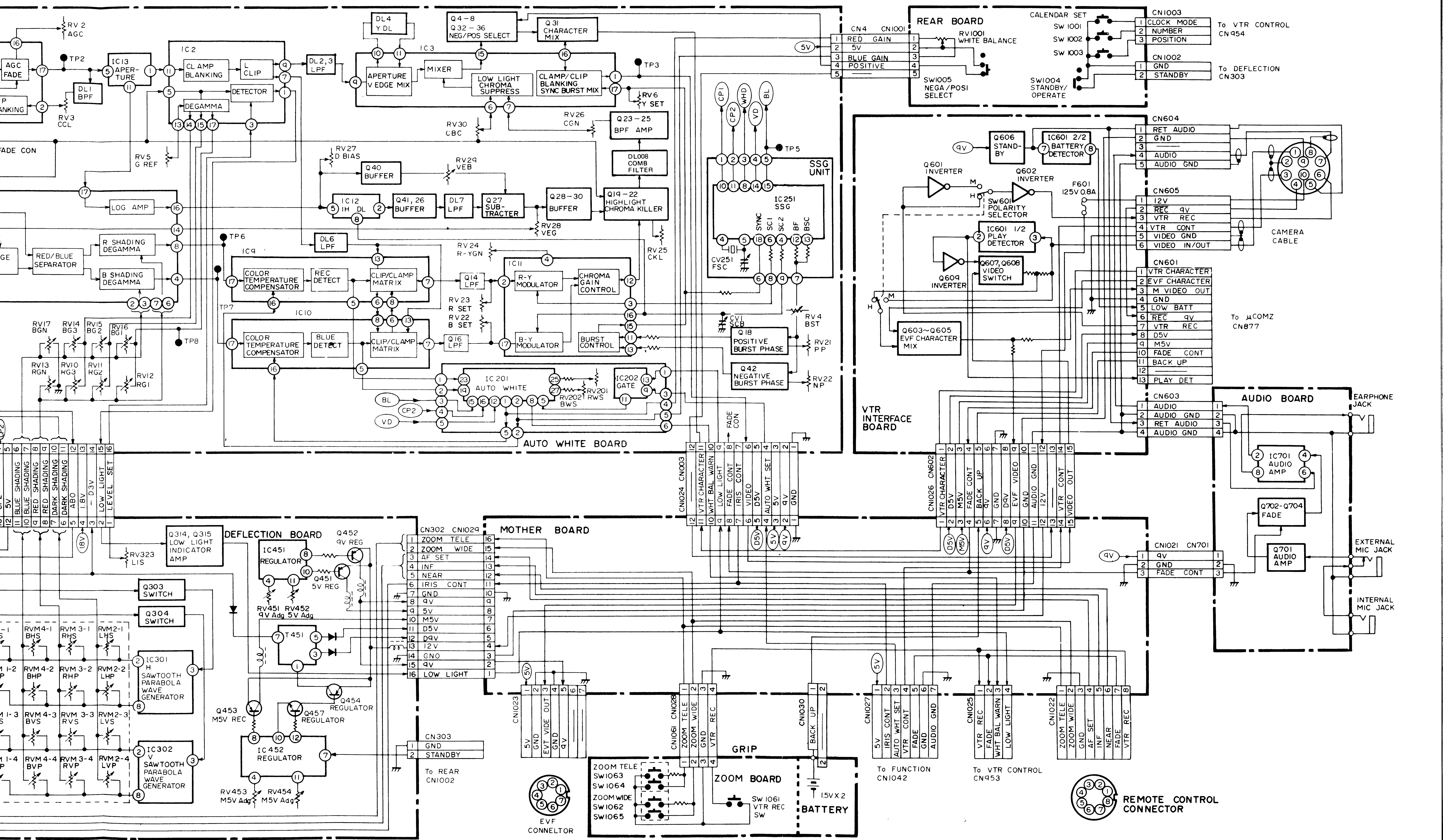
Electronic Viewfinder

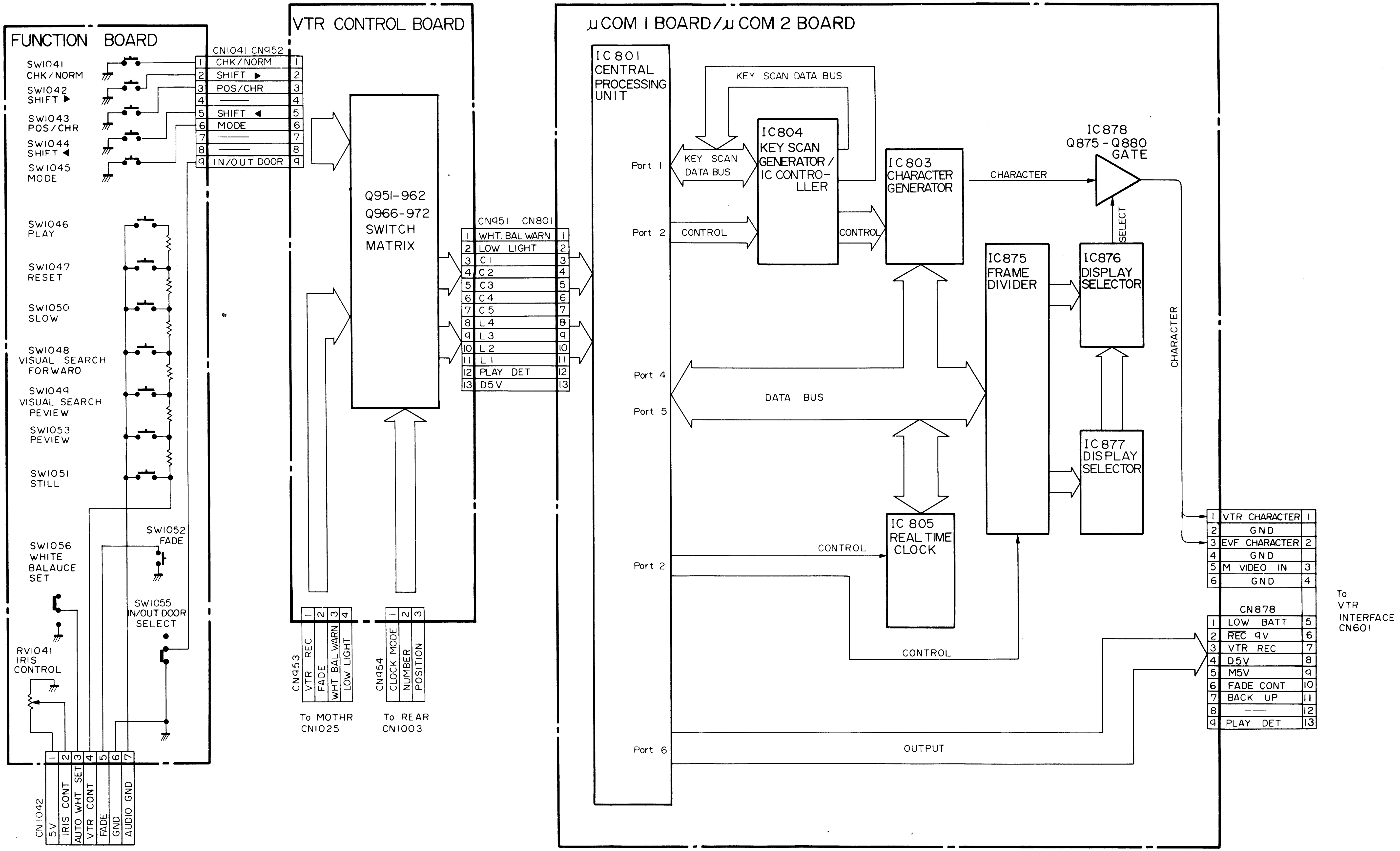


CN1101
5V
GND
EVF VIDEO IN
GND
9V
1
2
3
4
5
6
7
EVF CONNECTOR
EVF I BOARD
5V
9V
RV1101 CONTR
Q1101,Q1102 VIDE AMP
RV1102 BRIGHT
T1101 FLYBACK TRANSFORMER
CN1103
G
KH
H
CG
S
F
DEF COIL
CRT
LV1101 V.WID
Q1103 H. OUT
Q1104,Q1105 SPOT KILLER
RV1151 H HOLD
IC1151
H.AFC
SYNC SEDAR-ATOR
VERT BLANKING
V.OSC
Q1151 H. DRIVE
SW1151 PICTURE INVERSION SWITCH
R
L
CN1152
H. DEF
H. DEF
V.DEF
V.DEF
Q1152 Q1153 V. OUT
RV1152 V. HOLD
RV1153 V. HGT
VF2 BORD

Video/Deflection/Audio/Preamp/Mother/VTR Interface (V INT)


VIDEO BOARD
IC1
CLAMP BLACK CLIP
GAMMA
AGC FADE
AMP BLANKING
RV2 AGC
RV1 YPC
FADE CON
RV3 CCL
TP1
TP2
DL1 BPF
IC13 APER-TURE
IC2
CLAMP BLANKING
L CLIP
DETECTOR
DEGAMMA
RV5 G REF
DL2, 3 LPF
DL4 Y DL
Q4–8 Q32–36 NEG/POS SELECT
Q31 CHARACTER MIX
IC3
APERTURE V EDGE MIX
MIXER
LOW LIGHT CHROMA SUPPRESS
CLAMP/CLIP BLANKING SYNC BURST MIX
TP3
RV6 Y SET
RV30 CBC
RV26 CGN
Q23–25 BPF AMP
DL008 COMB FILTER
RV27 D BIAS
Q40 BUFFER
RV29 VEB
IC12 1H DL
Q41, 26 BUFFER
DL7 LPF
Q27 SUB-TRACTER
Q28–30 BUFFER
Q19–22 HIGHLIGHT CHROMA KILLER
RV28 VEG
TP5
SSG UNIT
IC251 SSG
SYNC SC1 SC2 BF BSC
CV251 FSC
CP1 CP2 WHD VD BL
π/2 PHASE SHIFTER
IC4
LOG AMP
DL5 1H DL
V. EDGE MIX
RED/BLUE SEPARATOR
R SHADING DEGAMMA
B SHADING DEGAMMA
TP6
DL6 LPF
RV24 R-YGN
RV25 CKL
IC9
COLOR TEMPERATURE COMPENSATOR
REC DETECT
CLIP/CLAMP MATRIX
Q14 LPF
IC11
R-Y MODULATOR
CHROMA GAIN CONTROL
RV23 R SET
RV22 B SET
TP7
IC10
COLOR TEMPERATURE COMPENSATOR
BLUE DETECT
CLIP/CLAMP MATRIX
Q16 LPF
B-Y MODULATOR
BURST CONTROL
CV1 SCB
Q18 POSITIVE BURST PHASE
RV4 BST
RV21 PP
Q42 NEGATIVE BURST PHASE
RV22 NP
TP8
RV17 BGN
RV14 BG3
RV15 BG2
RV16 BG1
RV13 RGN
RV10 HG3
RV11 HG2
RV12 RG1
Q39 BUFFER
IC201 AUTO WHITE
RV202 BWS
RV201 RWS
IC202 GATE
BL
CP2
VD
AUTO WHITE BOARD
FADE CON
5V
PREAMP BOARD
Q501~507 PRE AMP
CV501 SMEAP
CN501 CN1
5V
PRE VIDEO
GND
–D3V
LENS
ZOOM DRIVE UNIT
FOCUS CONTROL UNIT
IRIS CONTROL UNIT
LENS CONNECTOR
PICKUP TUBE / DEFLECTION COIL ASSY
TARGET
BIAS LIGHT
DEFLECTION COIL
TUBE SOCKET
CN306
AF B+
M5V
AF ON
AF INF
AF NEAR
GND
ZOOM ⊕
ZOOM ⊖
DRIVE ⊕
DRIVE ⊖
BRAKE ⊕
BRAKE ⊖
CN307
BIAS LIGHT
CN305
H DEF ⊕
H DEF ⊖
9V OUT
9V IN
V DEF ⊕
V DEF ⊖
G3, G6 (1350V)
G5 (650V)
G4 (200V)
C304
G2
G1
K
H (–D3V)
H
CN301 CN2
VIDEO
WHD
VD
CP2
5V
BLUE SHADING
BLUE SHADING
RED SHADING
RED SHADING
DARK SHADING
DARK SHADING
ABO
1.8V
–D3V
LOW LIGHT
LEVEL SET
CN1024 CN003
VTR CHARACTER
WHT BAL WARN
LOW LIGHT
FADE CONT
IRIS CONT
VIDEO
D5V
AUTO WHT SET
5V
9V
GND
DEFLECTION BOARD
Q320 Q321 AF DRIVE
Q324 BIAS LIGHT
RV325 BIAS LIGHT
Q307–Q309 Q323 BEAM BL
Q305, Q306 ABO
RV302 BEAM
T301 FLYBACK TRANS-FORMER
Q301, Q302 HIGH VOLTAGE DRIVE
LV301 WID
Q322 IRIS DRIVE
IC304 IRIS CONTROL
RV324 AVL
Q316–Q319 ZOOM DRIVE
RV301 FOC
TP301
Q310, Q311 DYNAMIC SHAD AMP
IC303 H. V DEF AMP
RV303 HLN
RV304 HCT
RV305 HGT
RV306 VCT
RVM 1-1 DHS
RVM 4-1 BHS
RVM 3-1 RHS
RVM 2-1 LHS
RVM 1-2 DHP
RVM 4-2 BHP
RVM 3-2 RHP
RVM 2-2 LHP
RVM 1-3 DVS
RVM 4-3 BVS
RVM 3-3 RVS
RVM 2-3 LVS
RVM 1-4 DVP
RVM 4-4 BVP
RVM 3-4 RVP
RVM 2-4 LVP
IC301 H SAWTOOTH PARABOLA WAVE GENERATOR
IC302 V SAWTOOTH PARABOLA WAVE GENERATOR
Q314, Q315 LOW LIGHT INDICATOR AMP
RV323 LIS
Q303 SWITCH
Q304 SWITCH
18V
9V
M5V
IC451 REGULATOR
Q452 9V REG
Q451 5V REG
RV451 9V Adj
RV452 5V Adj
T451
Q454 REGULATOR
Q453 M5V REC
Q457 REGULATOR
IC452 REGULATOR
RV453 M5V Adj
RV454 M5V Adj
CN303
GND
STANDBY
To REAR CN1002
CN302 CN1029
ZOOM TELE
ZOOM WIDE
AF SET
INF
NEAR
IRIS CONT
GND
9V
5V
M5V
D5V
D9V
12V
GNO
9V
LOW LIGHT
MOTHER BOARD
D5V 5V 9V
CN1023
5V
GND
EVT VIDE OUT
GND
9V
EVF CONNELTOR
CN1061 CN1028
ZOOM TELE
ZOOM WIDE
GND
VTR REC
GRIP
ZOOM TELE SW1063 SW1064
ZOOM WIDE SW1062 SW1065
ZOOM BOARD
SW1061 VTR REC SW
CN1030
BACK UP
1.5V×2
BATTERY


AUTO WHITE BOARD
RV2 AGC
AGC FADE
TP2
IC13 APERTURE
IC2
CLAMP BLANKING
L CLIP
DETECTOR
DEGAMMA
DL1 BPF
RV3 CCL
RV5 G REF
FADE CON
DL2,3 LPF
DL4 Y DL
Q4-8 Q32-36 NEG/POS SELECT
Q31 CHARACTER MIX
IC3
APERTURE V EDGE MIX
MIXER
LOW LIGHT CHROMA SUPPRESS
CLAMP/CLIP BLANKING SYNC BURST MIX
TP3
RV6 Y SET
RV26 CGN
Q23-25 BPF AMP
RV30 CBC
DL008 COMB FILTER
RV27 D BIAS
Q40 BUFFER
RV29 VEB
LOG AMP
IC12 1H DL
Q41, 26 BUFFER
DL7 LPF
Q27 SUBTRACTER
Q28-30 BUFFER
Q19-22 HIGHLIGHT CHROMA KILLER
RV28 VEG
R SHADING DEGAMMA
B SHADING DEGAMMA
RED/BLUE SEPARATOR
TP6
DL6 LPF
RV24 R-YGN
RV25 CKL
IC9
COLOR TEMPERATURE COMPENSATOR
REC DETECT
CLIP/CLAMP MATRIX
Q14 LPF
IC11
R-Y MODULATOR
CHROMA GAIN CONTROL
RV23 R SET
RV22 B SET
IC10
BLUE DETECT
Q16 LPF
B-Y MODULATOR
BURST CONTROL
TP7
TP8
RV17 BGN
RV14 BG3
RV15 BG2
RV16 BG1
RV13 RGN
RV10 RG3
RV11 RG2
RV12 RG1
IC201 AUTO WHITE
IC202 GATE
RV202 BWS
RV201 RWS
BL
CP2
VD
CV1 SCB
Q18 POSITIVE BURST PHASE
Q42 NEGATIVE BURST PHASE
RV4 BST
RV21 PP
RV22 NP
SSG UNIT
IC251 SSG
SYNC SC1 SC2 BF BSC
CV251 FSC
CP1 CP2 WHD VD BL
TP5
REAR BOARD
CN4 CN1001
RED GAIN
5V
BLUE GAIN
POSITIVE
RV1001 WHITE BALANCE
SW1005 NEGA/POSI SELECT
CALENDAR SET
SW1001
SW1002
SW1003
CN1003
CLOCK MODE
NUMBER
POSITION
To VTR CONTROL CN954
CN1002
GND
STANDBY
To DEFLECTION CN303
SW1004 STANDBY/OPERATE
VTR INTERFACE BOARD
Q606 STAND-BY
IC601 2/2 BATTERY DETECTOR
Q601 INVERTER
Q602 INVERTER
SW601 POLARITY SELECTOR
F601 125V 0.8A
IC601 1/2 PLAY DETECTOR
Q607, Q608 VIDEO SWITCH
Q609 INVERTER
Q603~Q605 EVF CHARACTER MIX
CN604
RET AUDIO
GND
AUDIO
AUDIO GND
CN605
12V
REC 9V
VTR REC
VTR CONT
VIDEO GND
VIDEO IN/OUT
CAMERA CABLE
CN601
VTR CHARACTER
EVF CHARACTER
M VIDEO OUT
GND
LOW BATT
REC 9V
VTR REC
D5V
M5V
FADE CONT
BACK UP
PLAY DET
To µCOMZ CN877
CN603
AUDIO
AUDIO GND
RET AUDIO
AUDIO GND
AUDIO BOARD
EARPHONE JACK
IC701 AUDIO AMP
Q702-Q704 FADE
Q701 AUDIO AMP
EXTERNAL MIC JACK
INTERNAL MIC JACK
CN1021 CN701
9V
GND
FADE CONT
CN1024 CN003
VTR CHARACTER
WHT BAL WARN
LOW LIGHT
FADE CONT
IRIS CONT
VIDEO
D5V
AUTO WHT SET
5V
9V
GND
CN1026 CN602
VTR CHARACTER
D5V
M5V
FADE CONT
BACK UP
9V
GND
D9V
EVF VIDEO
GND
AUDIO GND
12V
VTR CONT
VIDEO OUT
BLUE SHADING
BLUE SHADING
RED SHADING
RED SHADING
DARK SHADING
DARK SHADING
ABO
1.8V
-D3V
LOW LIGHT
LEVEL SET
DEFLECTION BOARD
Q314, Q315 LOW LIGHT INDICATOR AMP
RV323 LIS
Q303 SWITCH
Q304 SWITCH
IC451 REGULATOR
Q452 9V REG
Q451 5V REG
RV451 RV452 9V Adg 5V Adg
T451
Q453 M5V REC
Q457 REGULATOR
Q454 REGULATOR
IC452 REGULATOR
RV453 M5V Adg
RV454 M5V Adg
CN303
GND
STANDBY
To REAR CN1002
RVM4-1 BHS
RVM3-1 RHS
RVM2-1 LHS
RVM4-2 BHP
RVM3-2 RHP
RVM2-2 LHP
RVM4-3 BVS
RVM3-3 RVS
RVM2-3 LVS
RVM4-4 BVP
RVM3-4 RVP
RVM2-4 LVP
IC301 H SAWTOOTH PARABOLA WAVE GENERATOR
IC302 V SAWTOOTH PARABOLA WAVE GENERATOR
CN302 CN1029
ZOOM TELE
ZOOM WIDE
AF SET
INF
NEAR
IRIS CONT
GND
9V
5V
M5V
D5V
D9V
12V
GNO
9V
LOW LIGHT
MOTHER BOARD
CN1023
5V
GND
EVT VIDE OUT
GND
9V
EVF CONNELTOR
CN1061 CN1028
ZOOM TELE
ZOOM WIDE
GND
VTR REC
GRIP
ZOOM BOARD
ZOOM TELE SW1063 SW1064
ZOOM WIDE SW1062 SW1065
SW1061 VTR REC SW
CN1030
BACK UP
1.5V X 2
BATTERY
CN1027
5V
IRIS CONT
AUTO WHT SET
VTR CONT
FADE
GND
AUDIO GND
To FUNCTION CN1042
CN1025
VTR REC
FADE
WHT BAL WARN
LOW LIGHT
To VTR CONTROL CN953
CN1022
ZOOM TELE
ZOOM WIDE
GND
AF SET
INF
NEAR
FADE
VTR REC
REMOTE CONTROL CONNECTOR

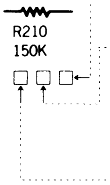

FUNCTION BOARD
SW1041 CHK/NORM
SW1042 SHIFT ▶
SW1043 POS/CHR
SW1044 SHIFT ◀
SW1045 MODE
SW1046 PLAY
SW1047 RESET
SW1050 SLOW
SW1048 VISUAL SEARCH FORWARD
SW1049 VISUAL SEARCH PEVIEW
SW1053 PEVIEW
SW1051 STILL
SW1056 WHITE BALAUCE SET
SW1052 FADE
SW1055 IN/OUT DOOR SELECT
RV1041 IRIS CONTROL
CN1042
1 5V
2 IRIS CONT
3 AUTO WHT SET
4 VTR CONT
5 FADE
6 GND
7 AUDIO GND
CN1041 CN952
1 CHK/NORM 1
2 SHIFT ▶ 2
3 POS/CHR 3
4 —— 4
5 SHIFT ◀ 5
6 MODE 6
7 —— 7
8 —— 8
9 IN/OUT DOOR 9
VTR CONTROL BOARD
Q951-962
Q966-972
SWITCH MATRIX
CN953
1 VTR REC
2 FADE
3 WHT BAL WARN
4 LOW LIGHT
To MOTHR CN1025
CN954
1 CLOCK MODE
2 NUMBER
3 POSITION
To REAR CN1003
CN951 CN801
1 WHT. BAL WARN 1
2 LOW LIGHT 2
3 C1 3
4 C2 4
5 C3 5
6 C4 6
7 C5 7
8 L4 8
9 L3 9
10 L2 10
11 L1 11
12 PLAY DET 12
13 D5V 13
µCOM 1 BOARD/µCOM 2 BOARD
IC801 CENTRAL PROCESSING UNIT
Port 1
Port 2
Port 4
Port 5
Port 2
Port 6
KEY SCAN DATA BUS
KEY SCAN DATA BUS
CONTROL
IC804 KEY SCAN GENERATOR / IC CONTRO-LLER
CONTROL
IC803 CHARACTER GENERATOR
CHARACTER
IC878 Q875-Q880 GATE
SELECT
IC875 FRAME DIVIDER
IC876 DISPLAY SELECTOR
IC877 DISPLAY SELECTOR
CHARACTER
DATA BUS
IC805 REAL TIME CLOCK
CONTROL
CONTROL
OUTPUT
1 VTR CHARACTER 1
2 GND
3 EVF CHARACTER 2
4 GND
5 M VIDEO IN 3
6 GND 4
CN878
1 LOW BATT 5
2 REC 9V 6
3 VTR REC 7
4 D5V 8
5 M5V 9
6 FADE CONT 10
7 BACK UP 11
8 —— 12
9 PLAY DET 13
To VTR INTERFACE CN601

DIAGRAMS

WHEN USING THIS SERVICE REFERENCE MATERIAL

How to read abbreviations

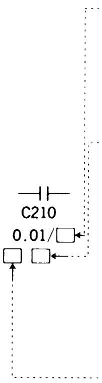
< Resistors >

	Unit indication	No indication .... Ω K .... kΩ
	Tolerance indication	No indication .... ± 5% K .... ± 10% M .... ± 20%
	Power capacitance indication	No indication .... 1/4W (All those other than 1/4W are indicated in the circuit diagram. W is omitted.)
	Type indication	No indication ..... Carbon film fixed (carbon) RC .... Carbon solid (solid) RW .... Power type on fixed RS .... Oxide metal film fixed RN .... Metal film fixed

Example

R210
150K .... 150kΩ, carbon solid
RE1/2K .... 1/2W, ±10%

< Capacitors >

	Unit indication	No indication .... μF P .... PF
	Withstand voltage indication	No indication .... 50 WV (Those other than 50 WV and electrolytic capacitor are indicated in the diagram. WV omitted.)
	Tolerance indication	No indication .... ± 10% J .... ± 5% M .... ± 20% C .... ± 0.25 PF Z .... $^{+80}_{-20}\%$ (Tolerance is not indicated for electrolytic capacitors (excluding tantalum capacitors, high-stability electrolytic capacitors)).
	Type indication	No indication .... Ceramic capacitor Ordinary electrolytic capacitor (Refer to the circuit symbol to discriminate between ceramic capacitor) ML .... Mylar (polyester film) STY .... Styrol TA .... Tantalum KU.. High-stability electrolytic capacitor MP .... Metalized paper

Example

C210
0.1/25 MYL J .... Mylar, 0.1 μF, 25 WV, ±5%

Note: 1. Voltages are besed on the values during normal operation, during no signal, (–) side of the power supply.

2. Unit, withstand voltage (power capacitance), tolerance and type of the resistors (excluding variable resistors) and capacitors are indicated with abbreviation in the circuit diagram. It is requested to replace the parts correctly matching the abbreviation in the diagram with the list showing how to read the abbreviation.

Cautions when using MOS ICs

1. MOS ICs are inserted into black sponge for shipment.

   This sponge is conductive and is used to short-circuit between leads to prevent damage. As a result, do not pull out ICs from this black sponge during the storage of ICs. Avoid pulling out ICs from the sponge and putting them on the plastic which is likely to be charged or inserting them in foamed styrol.
2. High voltages may be applied to ICs due to leakage from the soldering iron during soldering, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body and clothes made of chemical fibre, nylon gloves, etc., may be charged to several thousand volts due to friction, so be sure to ground body during work.
4. Be sure to ground measuring instruments such as the oscilloscope, VTVM, etc., which are used for repairs, before starting work.

SCHEMATIC/CIRCUIT BOARD DIAGRAMS

CONTENTS

1. PREAMPLIFIER

Schematic diagram 98
Circuit board diagram 98

2. VIDEO

Schematic diagram 100
Circuit board diagram 107

3. SSG

Circuit board diagram 106

4. AUTO WHITE BALANCE

Schematic diagram 109
Circuit board diagram 111

5. REAR

Schematic diagram 112

6. DEFLECTION

Schematic diagram 113
Circuit board diagram 117

7. ZOOM/GRIP

Schematic diagram 119
Circuit board diagram 119

8. MOTHER

Schematic diagram 120
Circuit board diagram 121

9. VTR INTERFACE

Schematic diagram 123
Circuit board diagram 125

10. U CON 1/VTR CONTROL

Schematic diagram 128

11. VTR CONTROL

Circuit board diagram 132

12. U CON 2

Schematic diagram 133

13. U CON 1/U CON 2

Circuit board diagram 135

14. ELECTRONIC VIEWFINDER

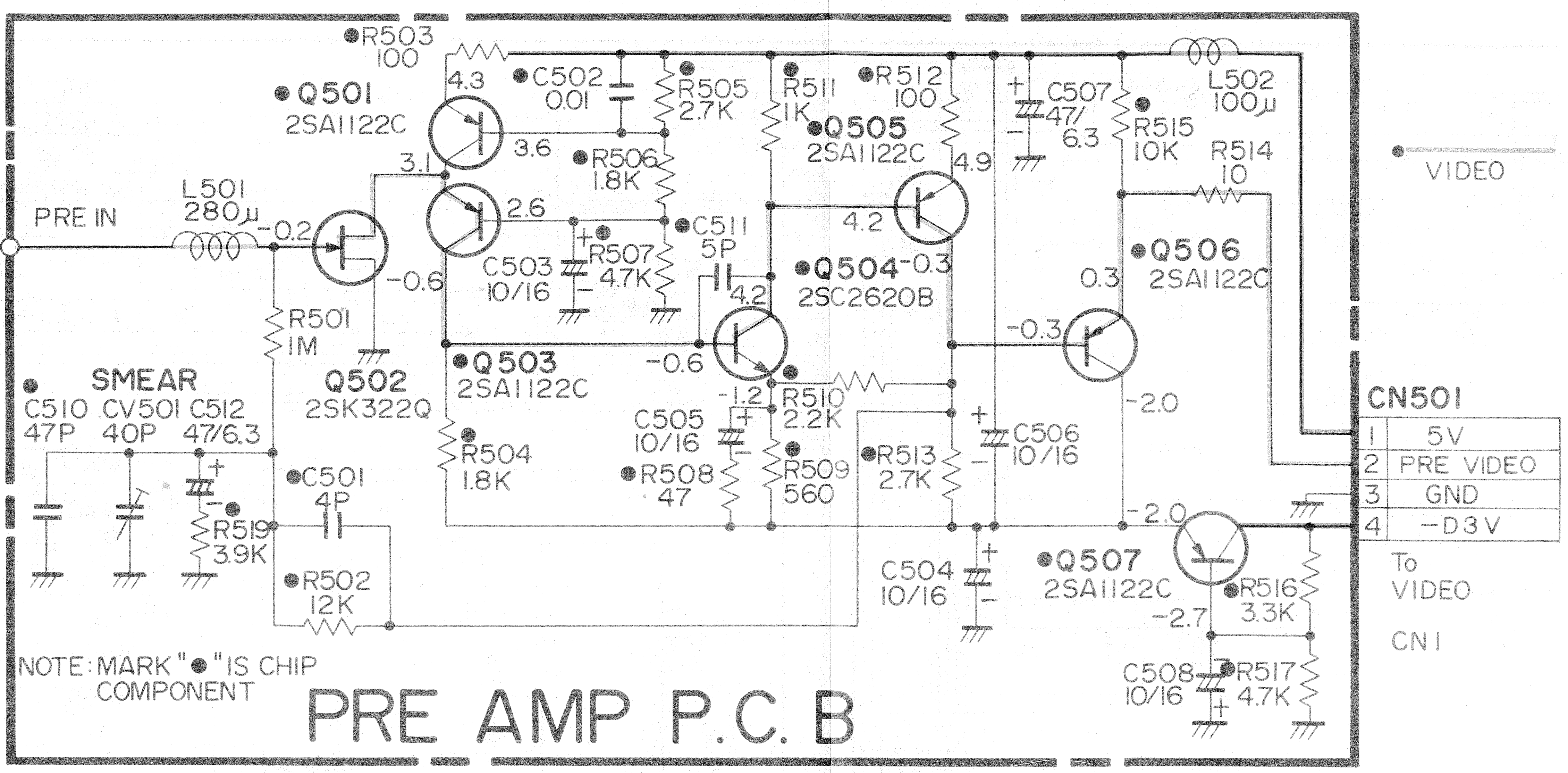
Schematic diagram 137
Circuit board diagram 139

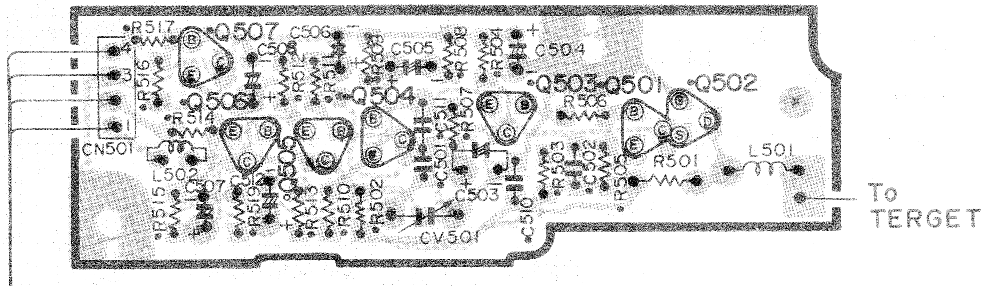
15. AUDIO

Schematic diagram 142
Circuit board diagram 144

16. FUNCTION SWITCH PANEL

Schematic diagram 145


R503
100
Q501
2SA1122C
4.3
C502
0.01
R505
2.7K
R511
1K
R512
100
C507
47/
6.3
R515
10K
L502
100μ
R514
10
VIDEO
3.6
3.1
R506
1.8K
Q505
2SA1122C
4.9
4.2
To
TERGET
PRE IN
L501
280μ
-0.2
2.6
C511
5P
C503
10/16
R507
4.7K
Q504
2SC2620B
-0.3
0.3
Q506
2SA1122C
-0.6
4.2
-0.3
R501
1M
Q502
2SK322Q
Q503
2SA1122C
-0.6
-1.2
R510
2.2K
-2.0
SMEAR
C510
47P
CV501
40P
C512
47/6.3
C505
10/16
C506
10/16
CN501
1 5V
2 PRE VIDEO
3 GND
4 -D3V
R504
1.8K
R509
560
R513
2.7K
C501
4P
R508
47
R519
3.9K
-2.0
Q507
2SA1122C
R502
12K
C504
10/16
R516
3.3K
-2.7
To
VIDEO
CN1
C508
10/16
R517
4.7K
NOTE: MARK "●" IS CHIP
COMPONENT
PRE AMP P.C.B


R517
Q507
C506
C508
C505
C504
R516
Q506
Q504
Q503
Q501
Q502
R514
R506
CN501
R501
L501
L502
R515
C507
R519
R513
R510
R502
C503
CV501
C510
R505
To
TERGET

PREAMPLIFIER P.C.B

▨ Soldered side

▨ Parts side

● Through·hole

CN501

4	−D3V
3	GND
2	PRE VIDEO
1	5V

To
VIDEO
CN1

Q501

B	3.6
C	3.1
E	4.3

Q502

G	−0.2
D	3.1
S	—

Q503

B	2.6
C	−0.6
E	3.1

Q504

B	−0.6
C	4.2
E	−1.2

Q505

B	4.2
C	−0.3
E	4.9

Q506

B	−0.3
C	−2.0
E	0.3

Q507

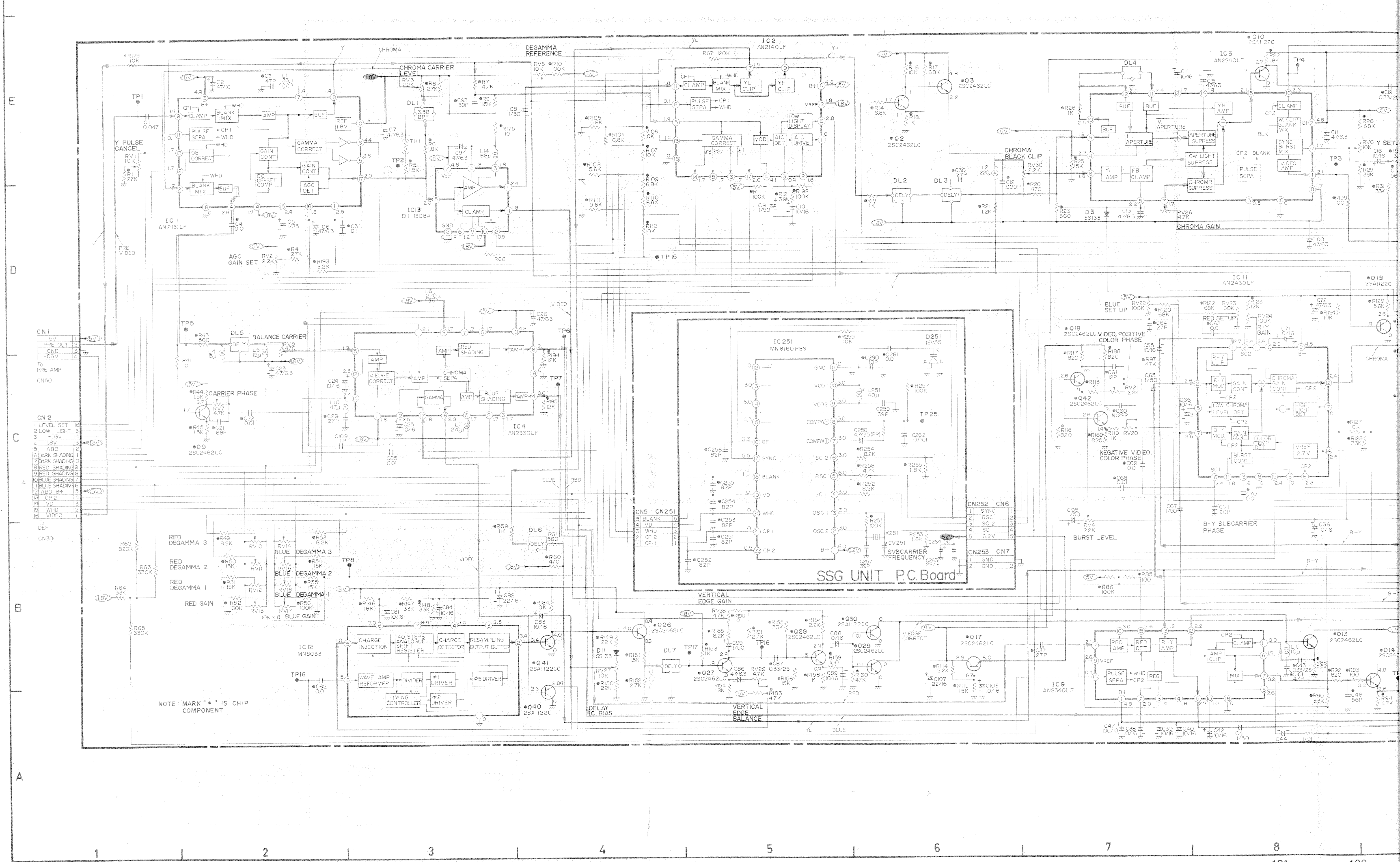
B	−2.7
C	—
E	−2.0

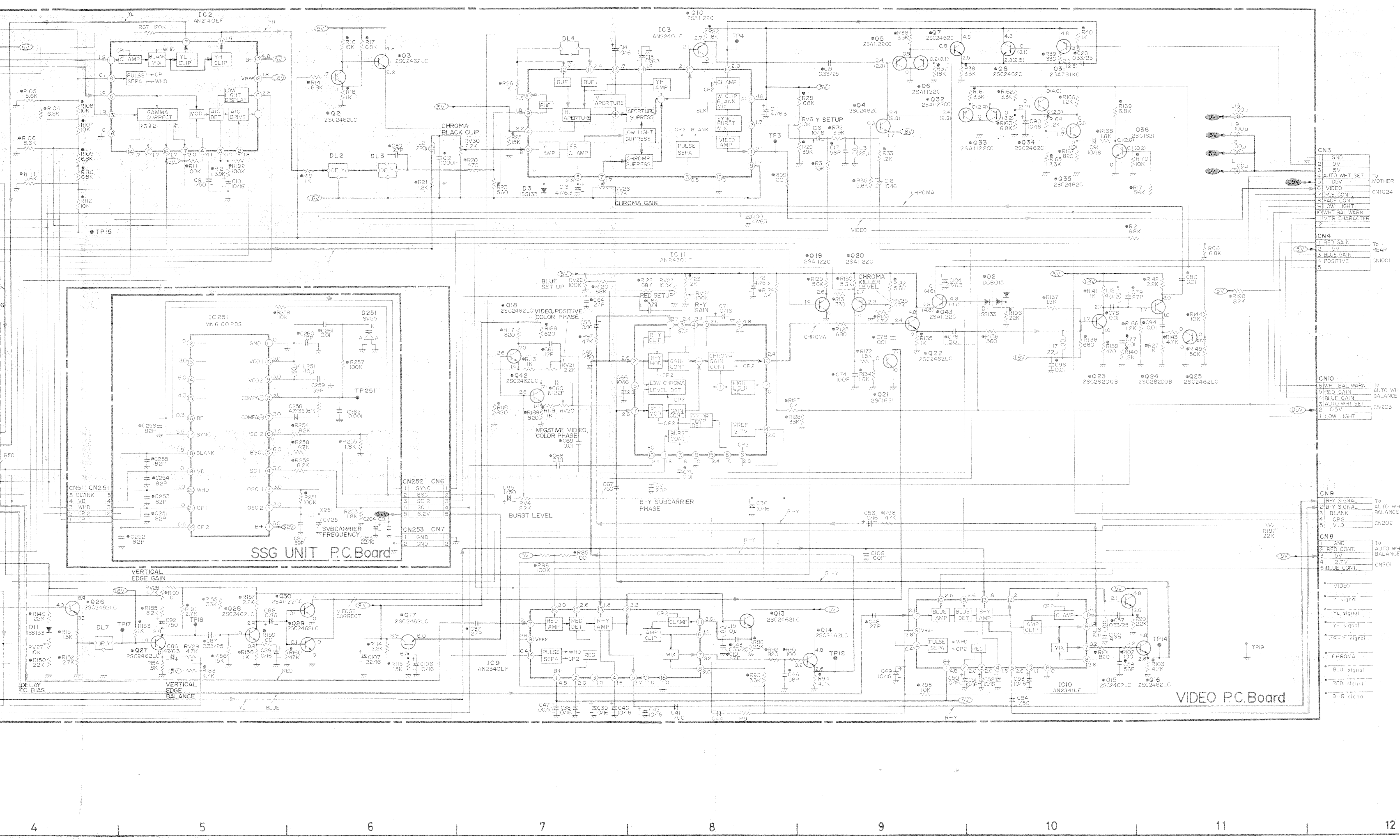
E
D
C
B
A

VK

1 2 3 4 5 6 7 8

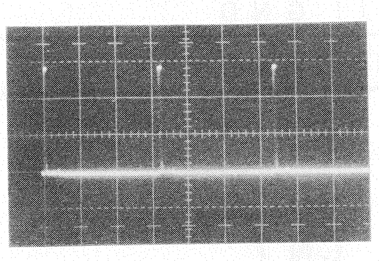
VIDEO


E
D
C
B
A
1
2
3
4
5
6
7
8
IC 1 AN2131LF
CLAMP
BLANK MIX
PULSE SEPA
OB CORRECT
AMP
BUF
REF 1.8V
GAMMA CORRECT
GAIN CONT
DC OFFSET COMP
AGC DET
Y PULSE CANCEL
AGC GAIN SET
PRE VIDEO
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP15
TP16
TP17
TP18
CHROMA
CHROMA CARRIER LEVEL
DEGAMMA REFERENCE
IC13 DH-1308A
DL1 3.58 BPF
IC2 AN2140LF
YL CLIP
YH CLIP
GAMMA CORRECT
LOW LIGHT DISPLAY
AIC DET
AIC DRIVE
MOD
Q2 2SC2462LC
Q3 2SC2462LC
DL2
DL3
CHROMA BLACK CLIP
IC3 AN2240LF
DL4
H. APERTURE
V. APERTURE
APERTURE SUPRESS
LOW LIGHT SUPRESS
CHROMA SUPRESS
YL AMP
FB CLAMP
YH AMP
W. CLIP BLANK MIX
SYNC BURST MIX
VIDEO AMP
PULSE SEPA
CHROMA GAIN
Q10 2SA1122C
CN1
5V
PRE OUT
GND
-03V
To PRE AMP
CN501
CN2
LEVEL SET
LOW LIGHT
-03V
1.8V
ABO
DARK SHADING
DARK SHADING
RED SHADING
RED SHADING
BLUE SHADING
BLUE SHADING
ABO B+
CP2
VD
WHD
VIDEO
To DEF
CN301
DL5
BALANCE CARRIER
CARRIER PHASE
Q9 2SC2462LC
IC4 AN2330LF
V. EDGE CORRECT
RED SHADING
CHROMA SEPA
GAMMA
BLUE SHADING
RED DEGAMMA 3
RED DEGAMMA 2
RED DEGAMMA 1
RED GAIN
BLUE DEGAMMA 3
BLUE DEGAMMA 2
BLUE DEGAMMA 1
BLUE GAIN
10K x 8
DL6
IC12 MN8033
CHARGE INJECTION
140 STEPS ANALOGUE SHIFT RESISTER
CHARGE DETECTOR
RESAMPLING OUTPUT BUFFER
WAVE AMP REFORMER
DIVIDER
φ1 DRIVER
φ5 DRIVER
TIMING CONTROLLER
φ2 DRIVER
Q41 2SA1122CC
Q40 2SA1122C
NOTE: MARK "•" IS CHIP COMPONENT
IC 251 MN6160PBS
D251 1SV55
TP251
SSG UNIT P.C.Board
CN5 CN251
BLANK
VD
WHD
CP2
CP1
CN252 CN6
SYNC
BSC
SC2
SC1
6.2V
CN253 CN7
GND
SVBCARRIER FREQUENCY
VERTICAL EDGE GAIN
VERTICAL EDGE BALANCE
DELAY IC BIAS
Q26 2SC2462LC
Q27 2SC2462LC
Q28 2SC2462LC
Q29 2SC2462LC
Q30 2SA1122CC
DL7
D11 1SS133
V.EDGE CORRECT
Q17 2SC2462LC
IC9 AN2340LF
IC 11 AN2430LF
BLUE SET UP
RED SETUP
R-Y GAIN
Q18 2SC2462LC
Q42 2SC2462LC
VIDEO, POSITIVE COLOR PHASE
NEGATIVE VIDEO, COLOR PHASE
R-Y CLIP
R-Y MOD
B-Y MOD
GAIN CONT
CHROMA GAIN CONT
LOW CHROMA LEVEL DET
HIGH LIGHT DET
COLOR TEMP DET
BURST CONT
VREF 2.7V
B-Y SUBCARRIER PHASE
BURST LEVEL
Q19 2SA1122C
RED AMP
RED DET
R-Y AMP
CLAMP
AMP CLIP
MIX
PULSE SEPA
REG
Q13 2SC2462LC
Q14 2SC2462LC
Y SETUP

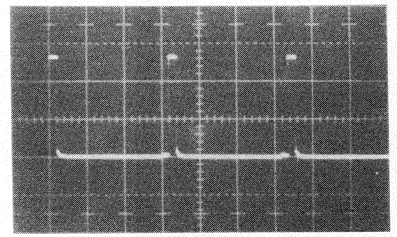

IC2 AN2140LF
CLAMP
BLANK MIX
YL CLIP
YH CLIP
PULSE SEPA
GAMMA CORRECT
MOD
AIC DET
AIC DRIVE
LOW LIGHT DISPLAY
Q2 2SC2462LC
Q3 2SC2462LC
CHROMA BLACK CLIP
DL2
DL3
DL4
IC3 AN2240LF
BUF
H. APERTURE
V. APERTURE
APERTURE SUPRESS
YH AMP
YL AMP
FB CLAMP
LOW LIGHT SUPRESS
CHROMR SUPRESS
PULSE SEPA
W. CLIP BLANK MIX
SYNC BURST MIX
VIDEO AMP
CHROMA GAIN
D3 1SS133
TP3
TP4
Q10 2SA1122C
Q5 2SA1122CC
Q7 2SC2462C
Q8 2SC2462C
Q31 2SA781KC
Q6 2SA1122C
Q32 2SA1122C
Q4 2SC2462C
Q33 2SA1122CC
Q34 2SC2462C
Q35 2SC2462C
Q36 2SC1621
RV6 Y SETUP
CHROMA
VIDEO
CN3
1 GND
2 9V
3 5V
4 AUTO WHT SET
5 D5V
6 VIDEO
7 IRIS CONT
8 FADE CONT
9 LOW LIGHT
10 WHT BAL WARN
11 VTR CHARACTER
12 —
To MOTHER CN1024
CN4
1 RED GAIN
2 5V
3 BLUE GAIN
4 POSITIVE
5 —
To REAR CN1001
IC11 AN2430LF
BLUE SET UP
RED SETUP
R-Y GAIN
CHROMA KILLER LEVEL
R-Y CLIP
R-Y MOD
B-Y MOD
GAIN CONT
CHROMA GAIN CONT
LOW CHROMA LEVEL DET
HIGH LIGHT DET
COLOR TEMP DET
BURST CONT
VREF 2.7V
B-Y SUBCARRIER PHASE
BURST LEVEL
Q18 2SC2462LC
VIDEO, POSITIVE COLOR PHASE
Q42 2SC2462LC
NEGATIVE VIDEO, COLOR PHASE
Q19 2SA1122C
Q20 2SA1122C
Q43 2SA1122C
Q22 2SC2462LC
Q21 2SC1621
D2 DC8015
D1 1SS133
Q23 2SC2620QB
Q24 2SC2620QB
Q25 2SC2462LC
CN10
6 WHT BAL WARN
5 RED GAIN
4 BLUE GAIN
3 AUTO WHT SET
2 D5V
1 LOW LIGHT
To AUTO WHITE BALANCE CN203
CN9
1 R-Y SIGNAL
2 B-Y SIGNAL
3 BLANK
4 CP2
5 V D
To AUTO WHITE BALANCE CN202
CN8
1 GND
2 RED CONT.
3 5V
4 2.7V
5 BLUE CONT.
To AUTO WHITE BALANCE CN201
IC251 MN6160PBS
GND
VCO1
VCO2
COMPA-
COMPA+
SC2
BSC
SC1
OSC1
OSC2
B+
BF
SYNC
BLANK
VD
WHD
CP1
CP2
D251 1SV55
L251 40μ
TP251
X251
CV251
SVBCARRIER FREQUENCY
CN5 CN251
5 BLANK
4 VD
3 WHD
2 CP2
1 CP1
CN252 CN6
1 SYNC
2 BSC
3 SC2
4 SC1
5 6.2V
CN253 CN7
1 GND
2 GND
SSG UNIT P.C.Board
VERTICAL EDGE GAIN
Q26 2SC2462LC
D11 1SS133
DL7
TP17
TP18
Q27 2SC2462LC
Q28 2SC2462LC
Q29 2SC2462LC
Q30 2SA1122CC
V. EDGE CORRECT
Q17 2SC2462LC
DELAY IC BIAS
VERTICAL EDGE BALANCE
IC9 AN2340LF
RED AMP
RED DET
R-Y AMP
CLAMP
AMP CLIP
MIX
PULSE SEPA
REG
VREF
Q13 2SC2462LC
Q14 2SC2462LC
TP12
IC10 AN2341LF
BLUE AMP
BLUE DET
B-Y AMP
Q15 2SC2462LC
Q16 2SC2462LC
TP14
TP19
VIDEO
Y signal
YL signal
YH signal
B-Y signal
CHROMA
BLU signal
RED signal
B-R signal
VIDEO P.C.Board
4
5
6
7
8
9
10
11
12

WAVEFORMS

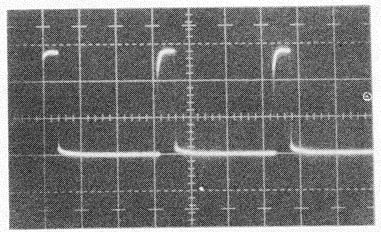
CN5-1
2V/20 μsec · div



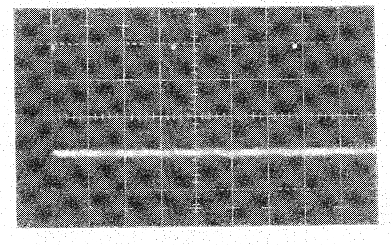
CN5-1
2V/20 μsec · div



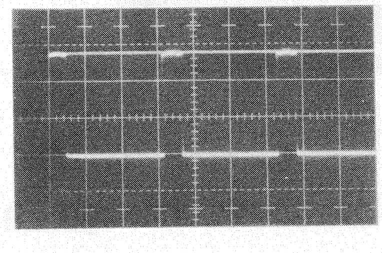
CN5-3
2V/20 μsec · div



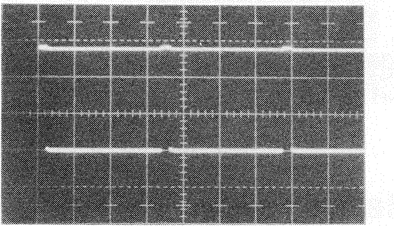
CN5-4
2V/5msec · div



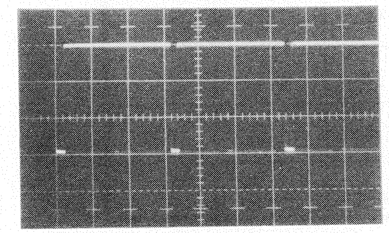
CN5-5
2V/20 μsec · div



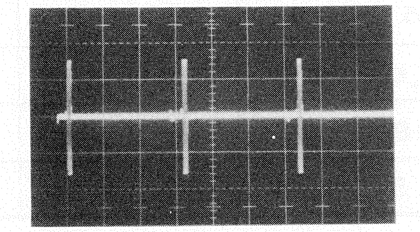
CN5-5
2V/5msec · div



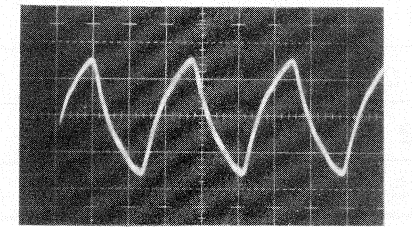
CN6-1
2V/20 μsec · div



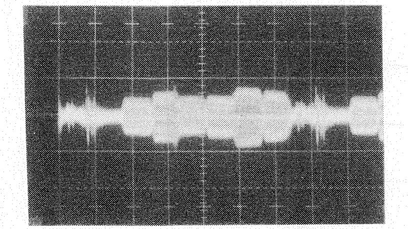
CN6-2
0.5V/20 μsec · div



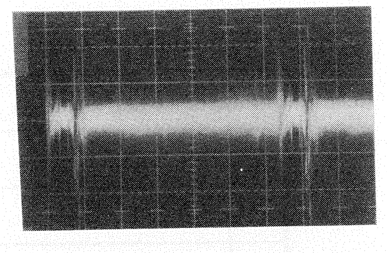
CN6-3
0.2V/0.1 μsec · div



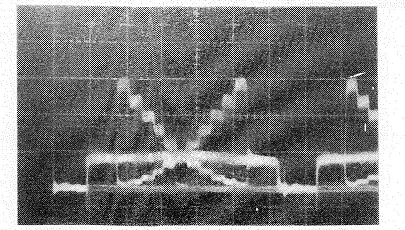
Q23 BASE
50mV/10 μsec · div



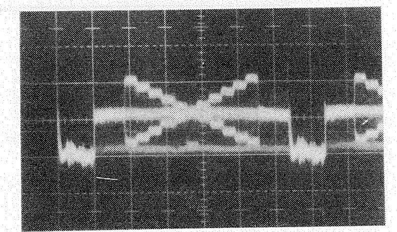
Q30 COLLECTOR
50mV/10 μsec · div



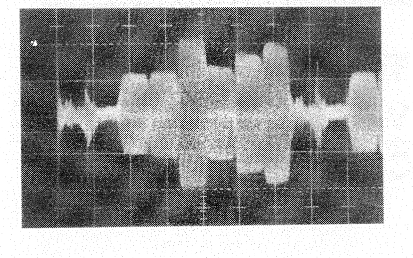
IC1-8
0.2V/10 μsec · div



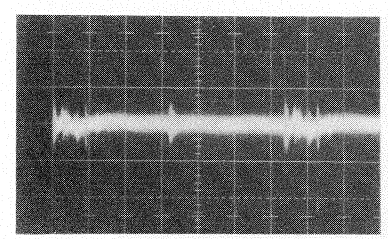
IC3-9
50mV/10 μsec · div



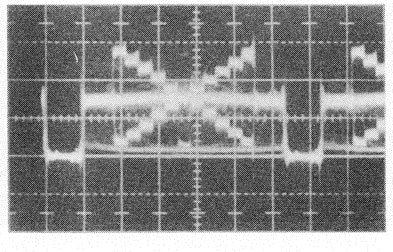
IC3-7
50mV/10 μsec · div



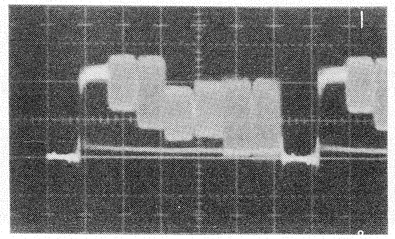
IC3-13
50mV/10 μsec · div



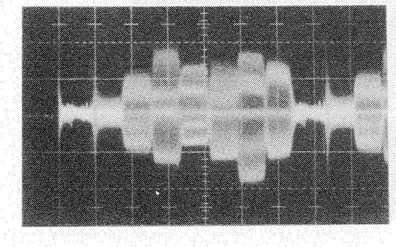
IC3-15
0.5V/10 μsec · div



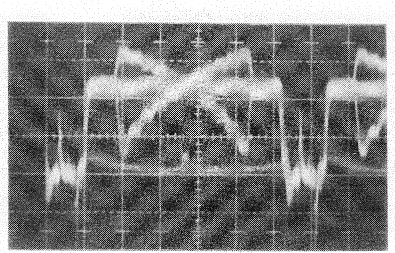
IC3-15
0.5V/10 μsec · div



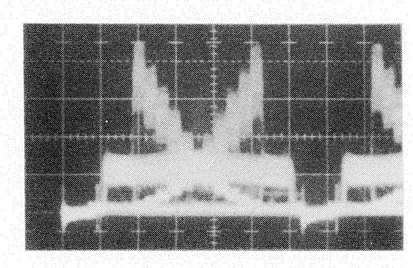
IC11-12
0.1V/10 μsec · div



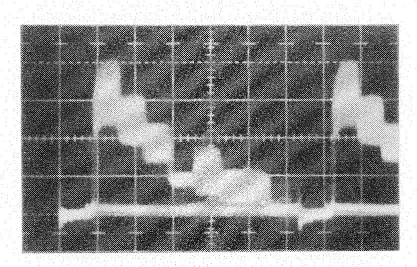
IC12-5
50mV/10 μsec · div



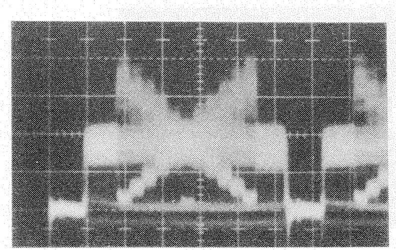
TP1
0.2V/10 μsec



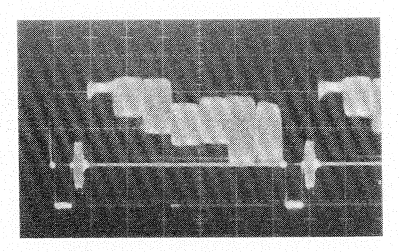
TP1
0.2V/10 μsec · div



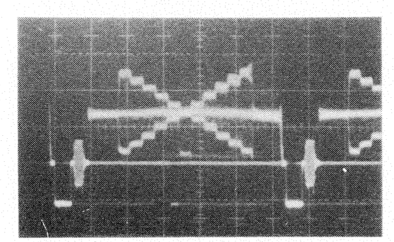
TP2
0.1V/10 μsec · div



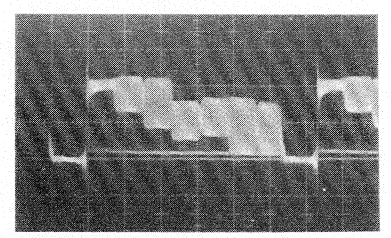
TP3
0.5V/10 μsec · div



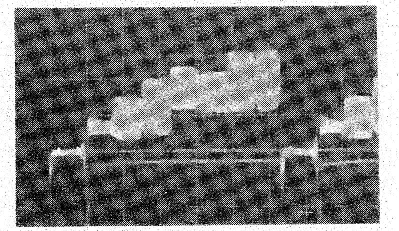
TP3
0.5V/10 μsec · div



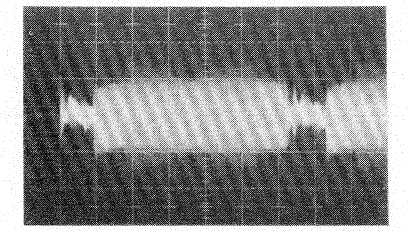
TP4 (POS)
0.5V/10 μsec · div



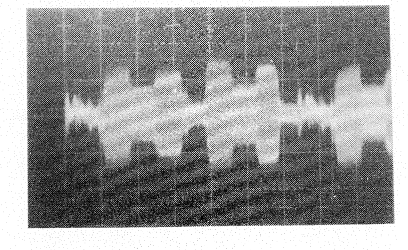
TP4 (NEG.)
0.5V/10 μsec · div



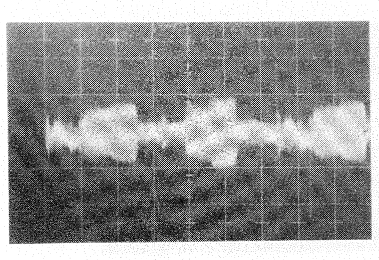
TP5
50mV/10 μsec · div



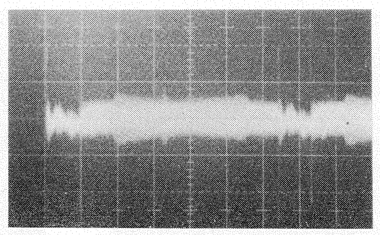
TP5
50mV/10 μsec · div



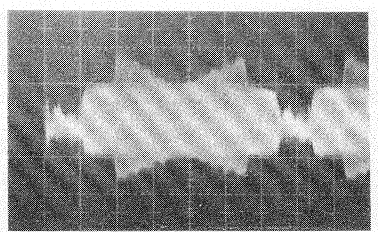
TP6
50mV/10 μsec・div



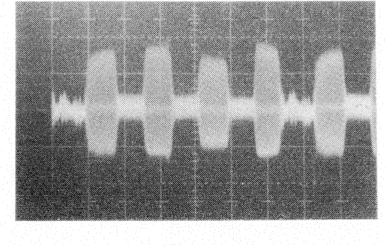
TP6
50mV/10 μsec・div



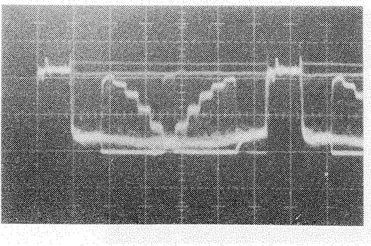
TP7
50mV/10 μsec・div



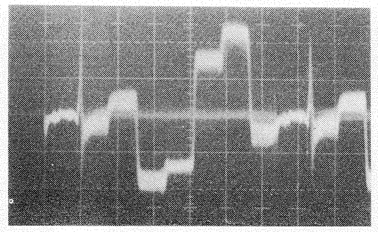
TP7
50mV/10 μsec・div



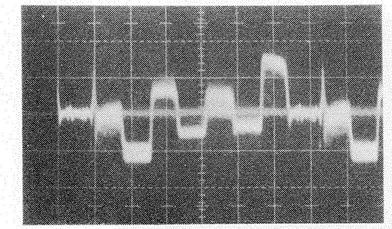
TP8
0.2V/10 μsec・div

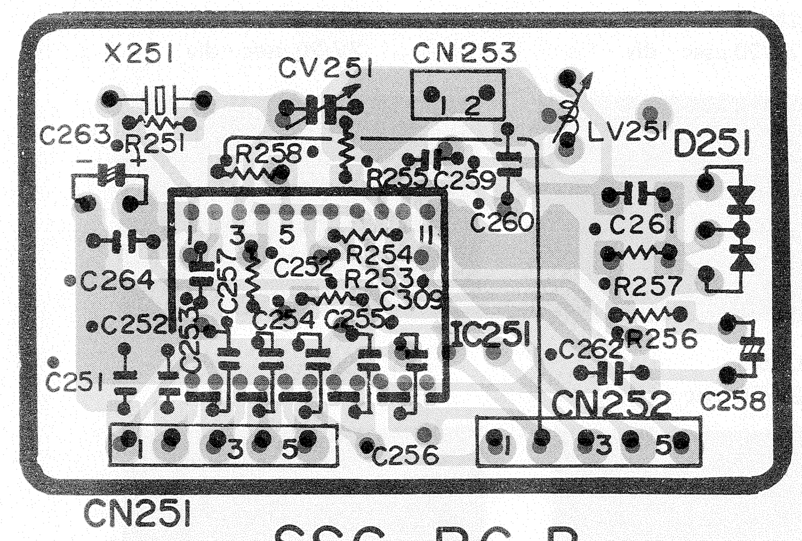


TP12
0.1V/10 μsec・div



TP14
0.1V/10 μsec・div




X251
CV251
CN253
C263
R251
R258
R255
C259
LV251
D251
C260
C261
C264
C257
C253
R254
R253
R257
C252
C309
C254
C255
IC251
C262
R256
C251
CN252
C258
C256
CN251

SSG P.C.B

▨ Soldered side ▨ Parts side ● Through hole

CN253	
1	GND
2	GND

To
VIDEO
CN 7

IC251

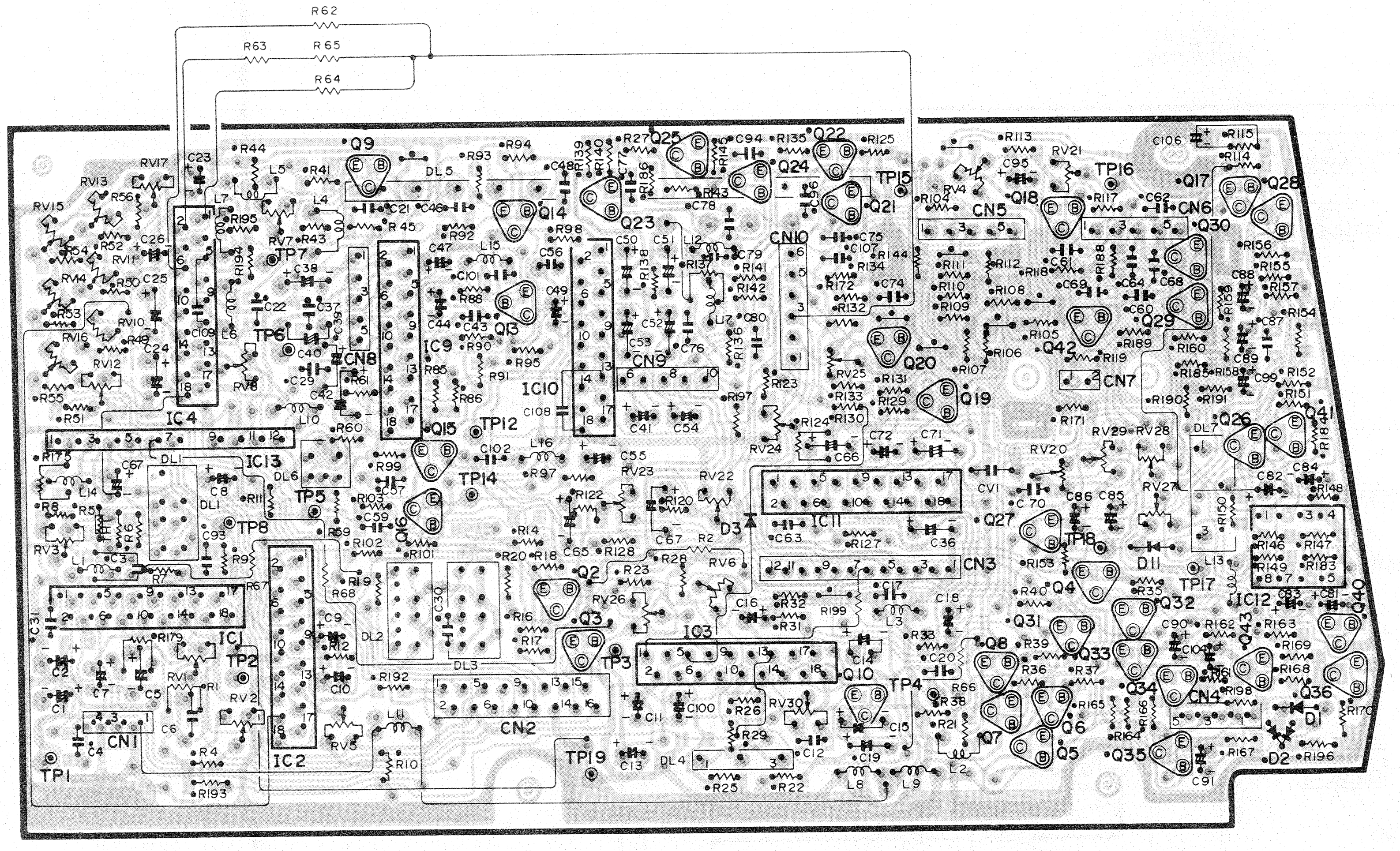
1	2	3	4	5	6	7	8	9	10	11
6.0	3.0	3.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0	0
22	21	20	19	18	17	16	15	14	13	12
0.5	0	1.0	0	1.5	5.5	0.3	4.3	6.0	3.0	0

CN 251	
1	CP1
2	CP2
3	WHD
4	VD
5	BLANK

To
VIDEO
CN5

CN 252	
1	SYNC
2	BSC
3	SC2
4	SC1
5	6.2V

To
VIDEO
CN6


R62
R63
R65
R64
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
IC1
IC2
IC3
IC4
IC9
IC10
IC11
IC12
IC13
DL1
DL2
DL3
DL4
DL5
DL6
DL7
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP12
TP14
TP15
TP16
TP17
TP18
TP19
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q31
Q32
Q33
Q34
Q35
Q36
Q40
Q41
Q42
Q43
D1
D2
D3
D11
RV1
RV2
RV3
RV4
RV5
RV6
RV7
RV8
RV9
RV10
RV11
RV12
RV13
RV15
RV16
RV17
RV20
RV21
RV22
RV23
RV24
RV25
RV26
RV27
RV28
RV29
RV30
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
L15
L16
CV1

▨ Soldered side ▨ Parts side ● Through-hole

VIDEO P.C.B

CN1

1	5V
2	PRE OUT
3	GND
4	−D3V

To
PRE AMP
CN501

CN2

1	LEVEL SET
2	LOW LIGHT
3	−D3V
4	1.8V
5	ABO
6	DARK SHADING
7	DARK SHADING
8	RED SHADING
9	RED SHADING
10	BLUE SHADING
11	BLUE SHADING
12	ABO B+
13	CP 2
14	VD
15	WHD
16	VIDEO

To
DEF
CN301

CN3

1	GND
2	9V
3	5V
4	AUTO WHT SET
5	D5V
6	VIDEO
7	IRIS CONT.
8	FADE CONT.
9	LOW LIGHT
10	WHT BAL WARN
11	VTR CHARACTER
12	——

To
MOTHER
CN1024

CN4

1	RED. GAIN
2	5V
3	BLUE. GAIN
4	POSITIVE
5	——

To
REAR
CN1001

CN5

1	CP 1
2	CP 2
3	WHD
4	VD
5	BLANK

To
SSG
CN251

CN6

5	6.2 V
4	SC 1
3	SC 2
2	BSC
1	SYNC

To
SSG
CN252

CN7

1	GND
2	GND

To
SSG
CN253

CN8

1	GND
2	RED CONT.
3	5 V
4	2.7V
5	BLUE CONT.

To
AUTO WHITE
BALANCE
CN201

CN 9

1	R-Y SIGNAL
2	B-Y SIGNAL
3	BLANK
4	CP 2
5	V.D

To
AUTO WHITE
BALANCE
CN202

CN 10

6	WHT BAL WARN
5	RED GAIN
4	BLUE GAIN
3	AUTO WHT SET
2	D5V
1	LOW LIGHT

To
AUTO WHITE
BALANCE
CN203

IC 1

1	3	5	7	9	11	13	15	17
2.5	4.9	3.8	1.9	1.9	0.1	1.7	2.9	2.0
2	4	6	8	10	12	14	16	18
1.7	2.6	4.4	1.9	1.8	1.7	1.7	1.8	0

IC 2

2	1.8	1	0
4	4.1	3	0.9
6	2.8	5	1.9
8	0.1	7	1.9
10	4.8	9	1.9
12	1.8	11	1.9
14	1.7	13	1.9
16	1.7	15	1.7
18	0	17	2.0

IC4

2	1.7	1	1.8
4	3.0	3	1.7
6	1.7	5	1.7
8	3.1	7	1.7
10	4.8	9	1.7
12	2.5	11	2.1
14	2.4	13	2.5
16	2.3	15	1.7
18	0	17	1.8

IC 9

2	2.0	1	4.8
4	1.6	3	1.9
6	1.9	5	2.7
8	2.6	7	3.2
10	1.0	9	2.6
12	2.2	11	3.0
14	0.4	13	1.8
16	3.0	15	2.6
18	0	17	2.1

IC10

2	2.0	1	4.8
4	1.6	3	2.0
6	1.9	5	2.6
8	2.6	7	3.2
10	1.1	9	2.6
12	2.1	11	3.0
14	0.4	13	1.8
16	2.5	15	2.6
18	0	17	2.1

IC 3

1	3	5	7	9	11	13	15	17
2.1	0.5	2.2	1.7	1.8	2.4	1.7	2.1	1.7
2	4	6	8	10	12	14	16	18
4.8	2.2	1.8	1.7	2.5	2.5	1.9	2.3	0

IC11

1	3	5	7	9	11	13	15	17
2.7	2.4	2.3	0	4.8	1.8	1.8	2.4	2.6
2	4	6	8	10	12	14	16	18
2.6	2.4	2.3	0	2.0	2.4	2.6	2.4	0

IC12

1	2	3	4
0	3.4	3.5	3.5
8	7	6	5
1.5	8.9	7.0	4.0

IC13

1	2	3	4	5	6	7	8	9	10	11	12
2.4	0	1.8	1.8	2.0	1.9	4.8	——	1.2	1.7	1.8	0.5

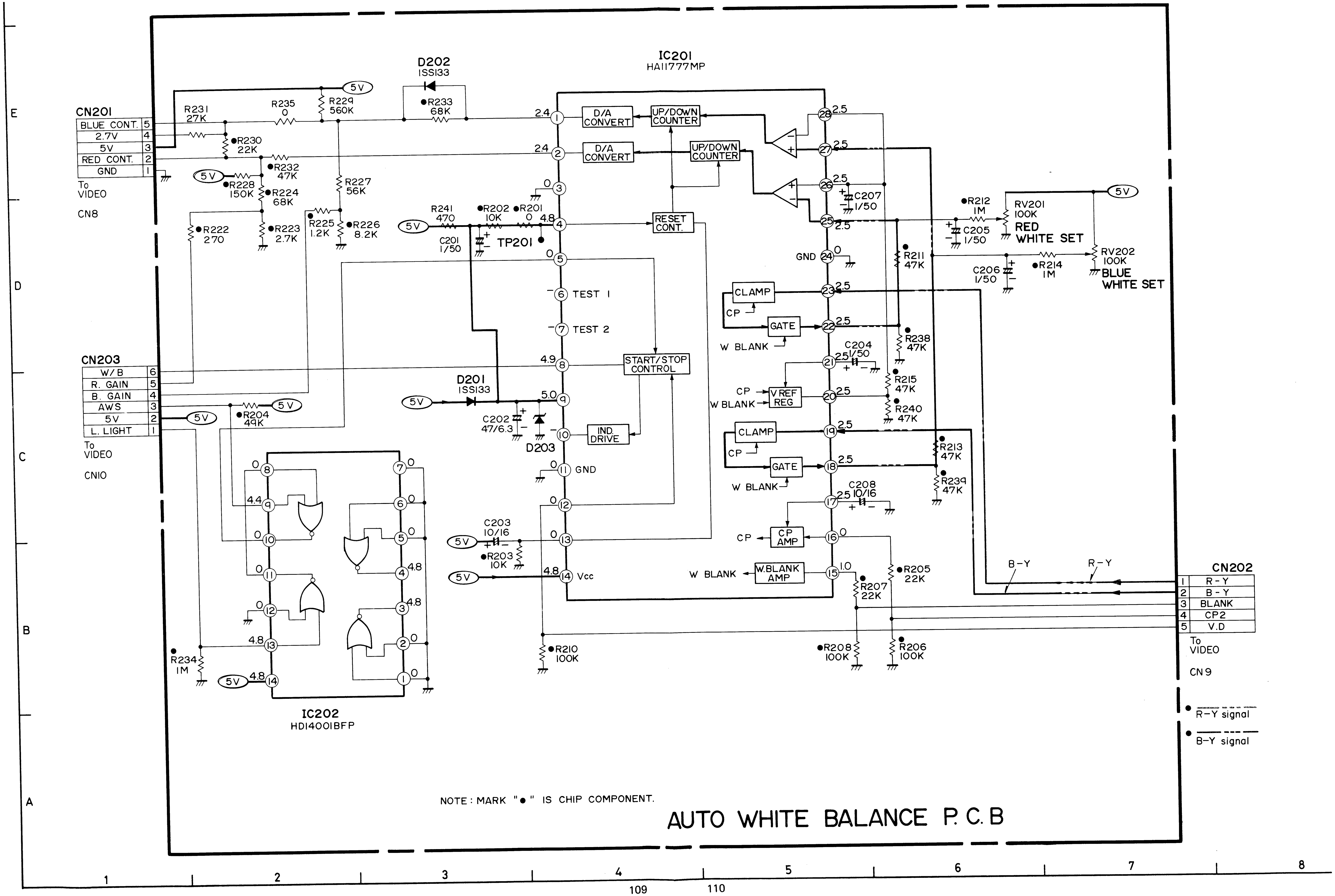
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
B		1.7	1.1	0.3	2.4(2.3)	0.2(0.1)	0.8	0(3.1)	1.7	2.1
C		1.1	4.8	2.4(2.3)	0	0	4.8	4.8	3.7	0
E		1.1	2.2	1.7	0.8	0.8	2.5	2.3(2.5)	1.1	2.7

	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
B		3.2	2.1	3.2	6.7	2.6	1.9	2.3	0.1	2.4
C		4.8	4.8	4.8	8.9	7.0	0	0.1	0	4.8
E		2.6	3.6	2.6	6.0	1.9	2.6	2.7	0	1.7

	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32
B	1.7	1.7	0(0.7)	4.0	1.9	1.5	0.1	0.1	4.8	2.4(2.3)
C	2.7	3.0	0	8.9	2.9	2.9	0	0	2.3(2.5)	0
E	1.0	1.0	0	3.3	0	0.9	0	0	4.8	0(2.9)

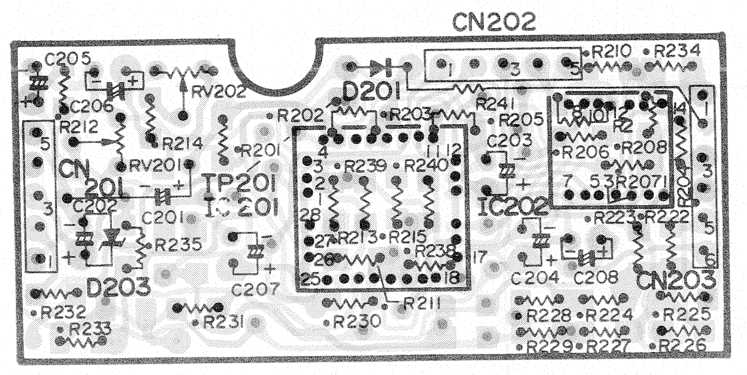
	Q33	Q34	Q35	Q36	Q40	Q41	Q42	Q43
B	0(3.2)	0(2.9)	0(1.7)	0.1(0.2)	2.3	3.4	2.6	4.3(4.1)
C	0	0(4.6)	0(3.1)	0.1(2.0)	0	4.0	7.1	0(4.6)
E	0(2.9)	0(2.3)	0(1.0)	0	2.89	0	1.9	4.8(4.8)

AUTO WHITE BALANCE


IC201
HA11777MP
D202
1SS133
●R233
68K
R235
0
R229
560K
R231
27K
●R230
22K
●R232
47K
●R228
150K
●R224
68K
R227
56K
R225
1.2K
●R226
8.2K
●R222
270
●R223
2.7K
R241
470
●R202
10K
●R201
0
C201
1/50
TP201
D201
1SS133
C202
47/6.3
D203
C203
10/16
●R203
10K
●R210
100K
●R204
49K
●R234
1M
CN201
BLUE CONT. 5
2.7V 4
5V 3
RED CONT. 2
GND 1
To
VIDEO
CN8
CN203
W/B 6
R. GAIN 5
B. GAIN 4
AWS 3
5V 2
L. LIGHT 1
To
VIDEO
CN10
5V
D/A
CONVERT
UP/DOWN
COUNTER
RESET
CONT.
START/STOP
CONTROL
IND
DRIVE
TEST 1
TEST 2
GND
Vcc
CLAMP
GATE
CP
W BLANK
V REF
REG
CP
AMP
W.BLANK
AMP
C207
1/50
C204
1/50
C208
10/16
●R212
1M
RV201
100K
RED
WHITE SET
C205
1/50
R211
47K
C206
1/50
●R214
1M
RV202
100K
BLUE
WHITE SET
●R238
47K
●R215
47K
●R240
47K
●R213
47K
●R239
47K
●R205
22K
●R207
22K
●R208
100K
●R206
100K
B-Y
R-Y
CN202
1 R-Y
2 B-Y
3 BLANK
4 CP2
5 V.D
To
VIDEO
CN9
R-Y signal
B-Y signal
IC202
HD14001BFP
2.4
2.4
0
4.8
0
4.9
5.0
0
0
4.8
2.5
2.5
2.5
2.5
0
2.5
2.5
2.5
2.5
2.5
2.5
2.5
0
1.0
4.4
4.8
4.8
A
B
C
D
E
1
2
3
4
5
6
7
8

NOTE : MARK "●" IS CHIP COMPONENT.

AUTO WHITE BALANCE P. C. B


CN202
C205
RV202
D201
R210
R234
C206
R212
R214
R201
RV201
CN 201
TP201
IC201
C202
C201
R235
D203
C207
R232
R233
R231
R230
R202
R203
R239
R240
R213
R215
R238
R211
R241
R205
C203
R206
R208
R207
IC202
R223
R222
C204
C208
CN203
R228
R224
R225
R229
R227
R226

AUTO WHITE P.C.B

IC 201

		4	5	6	7	8	9	10	11		
		0	0	—	—	4.9	5.0	—	0		
3	0									0.1	12
2	2.4									0	13
1	2.4									4.8	14
28	2.4									1.1	15
27	2.4									0.4	16
26	2.4									2.5	17
		2.4	0	2.5	2.4	2.4	2.4	2.5	2.4		
		25	24	23	22	21	20	19	18		

CN201

1	GND
2	RED CONT.
3	5 V
4	2.7V
5	BLUE CONT.

To
VIDEO
CN8

CN203

1	L.Light
2	D5 V
3	AWS
4	B.GAIN
5	R.GAIN
6	W/B

To
VIDEO
CN10

CN202

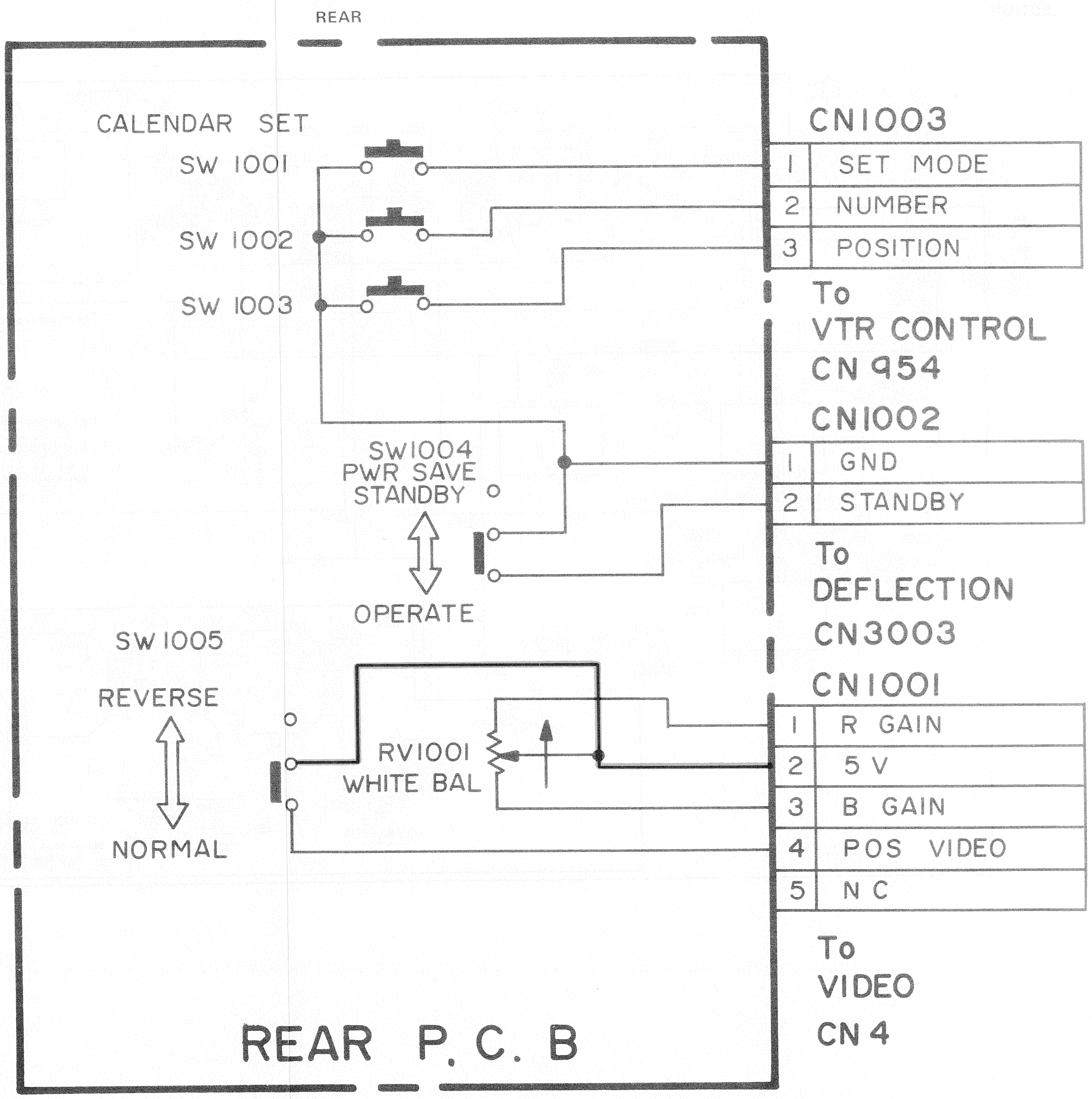
1	R-Y
2	B-Y
3	BLANK
4	CP 2
5	V.D

To
VIDEO
CN9

▨	Soldered side
▨	Parts side
●	Through – hole

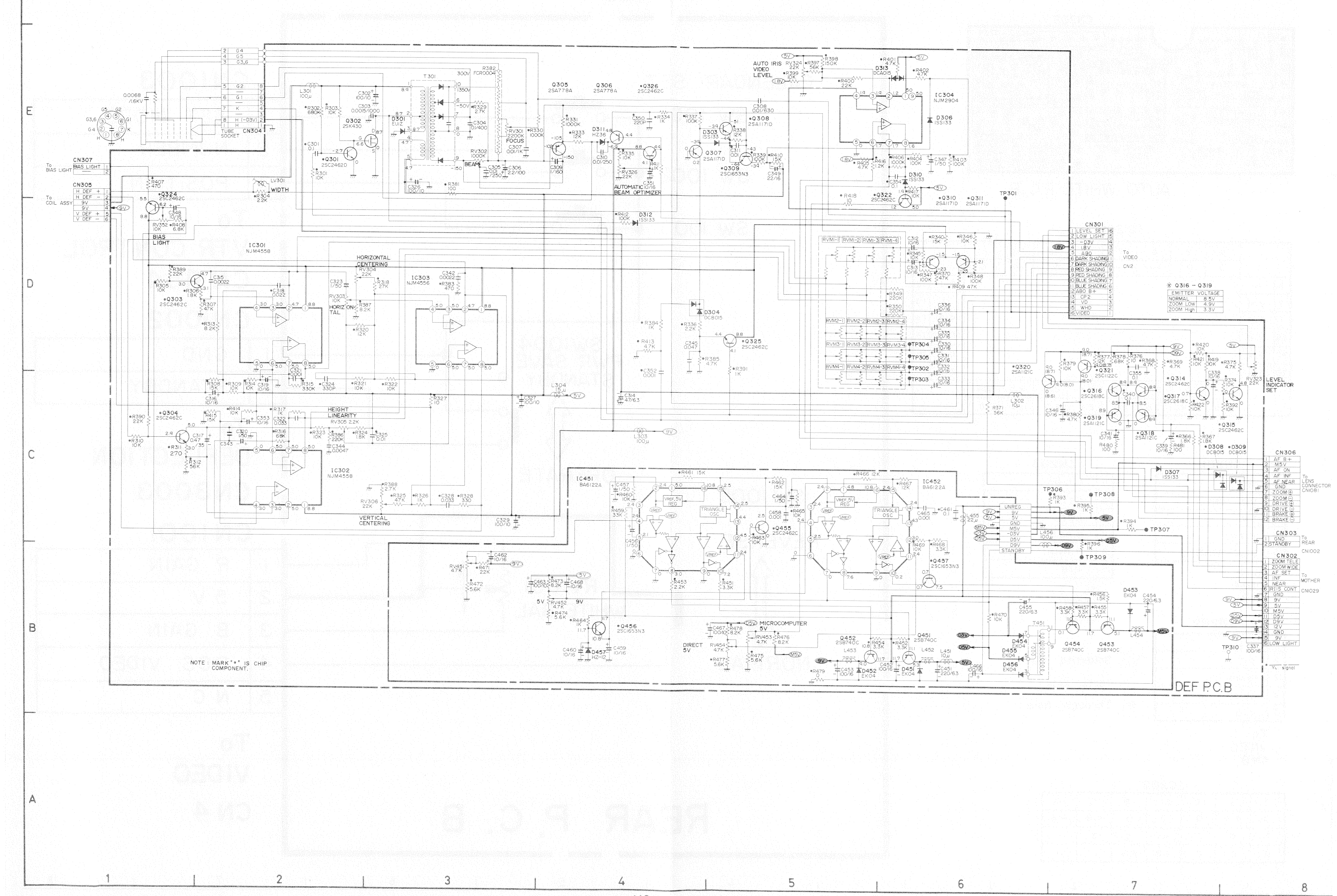
IC202

8	9	10	11	12	13	14
0	4.4	0	0	0	4.8	4.8
7	6	5	4	3	2	1
0	0	0	4.8	4.8	0	0


REAR
CALENDAR SET
SW 1001
SW 1002
SW 1003
SW1004
PWR SAVE
STANDBY
OPERATE
SW 1005
REVERSE
NORMAL
RV1001
WHITE BAL
CN1003
1 SET MODE
2 NUMBER
3 POSITION
To
VTR CONTROL
CN 954
CN1002
1 GND
2 STANDBY
To
DEFLECTION
CN3003
CN1001
1 R GAIN
2 5 V
3 B GAIN
4 POS VIDEO
5 N C
To
VIDEO
CN 4

REAR P. C. B

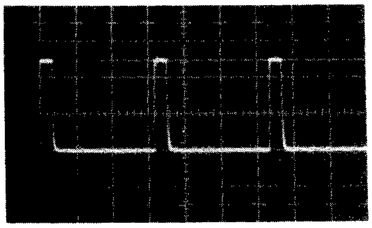
DEFLECTION


TUBE SOCKET
CN304
G4
G5
G3,6
G2
G1
K
H
H (-D3V)
0.0068 /1.6KV
CN307
To BIAS LIGHT
BIAS LIGHT
CN305
To COIL ASSY
H DEF +
H DEF −
9V
9V
V DEF +
V DEF −
LV301 WIDTH
Q324 2SC2462C
BIAS LIGHT
L301 100μ
Q301 2SC2462D
Q302 2SK430
D301 EU1Z
T301
R382 FCR0004
300V
1350V
−50V
RV301 2200K FOCUS
RV302 1000K BEAM
Q305 2SA778A
Q306 2SA778A
Q326 2SC2462C
D311 HZ36
AUTOMATIC BEAM OPTIMIZER
D312 1SS133
D303 1SS133
Q307 2SA1171D
Q308 2SA1171D
Q309 2SC1653N3
AUTO IRIS VIDEO LEVEL
RV324 22K
D313 DCA015
IC304 NJM2904
D306 1SS133
D310 1SS133
Q322 2SC2462C
Q310 2SA1171D
Q311 2SA1171D
TP301
IC301 NJM4558
Q303 2SC2462C
HORIZONTAL CENTERING
RV304 22K
IC303 NJM4556
RV303 10K HORIZONTAL
D304 DC8015
Q325 2SC2462C
L304 15μ
Q304 2SC2462C
HEIGHT LINEARITY RV305 2.2K
IC302 NJM4558
RV306 22K VERTICAL CENTERING
L303 100μ
CN301
LEVEL SET
LOW LIGHT
−D3V
1.8V
ABO
DARK SHADING
DARK SHADING
RED SHADING
RED SHADING
BLUE SHADING
BLUE SHADING
ABO B+
CP2
VD
WHD
VIDEO
To VIDEO CN2
※ Q316 − Q319
EMITTER VOLTAGE
NORMAL 8.5V
ZOOM LOW 4.9V
ZOOM High 3.3V
RVM1-1 RVM1-2 RVM1-3 RVM1-4
RVM2-1 RVM2-2 RVM2-3 RVM2-4
RVM3-1 RVM3-2 RVM3-3 RVM3-4
RVM4-1 RVM4-2 RVM4-3 RVM4-4
TP302
TP303
TP304
TP305
Q320 2SA1121C
Q321 2SC1122C
Q316 2SC2618C
Q319 2SA1121C
Q314 2SC2462C
Q317 2SC2618C
Q318 2SA1121C
Q315 2SC2462C
RV323 22K LEVEL INDICATOR SET
L302 10μ
D308 DC8015
D309 DC8015
D307 1SS133
CN306
AF B+
M5V
AF ON
AF INF
AF NEAR
GND
ZOOM⊕
ZOOM⊖
DRIVE⊕
DRIVE⊖
BRAKE⊕
BRAKE⊖
To LENS CONNECTOR CN1081
IC451 BA6122A
IC452 BA6122A
VREF 5V REG
TRIANGLE OSC
Q455 2SC2462C
Q457 2SC1653N3
TP306
TP307
TP308
TP309
UNREG
9V
5V
GND
M5V
−D3V
D5V
D9V
STANDBY
L455 22μ
L456 100μ
CN303
GND
STANDBY
To REAR CN1002
CN302
ZOOM TELE
ZOOM WIDE
AF SET
INF
NEAR
IRIS CONT
GND
9V
5V
M5V
D5V
D9V
12V
GND
9V
LOW LIGHT
To MOTHER CN1029
Q456 2SC1653N3
D457 HZ-12
RV451 47K
RV452 4.7K
MICROCOMPUTER 5V
DIRECT 5V
RV453 4.7K
Q452 2SB740C
Q451 2SB740C
Q454 2SB740C
Q453 2SB740C
T451
D451 EK04
D452 EK04
D453 EK04
D454 EK04
D455 EK04
D456 EK04
L451 10μ
L452
L453
L454
TP310
"YL" signal
DEF P.C.B
NOTE : MARK "*" IS CHIP COMPONENT.
E
D
C
B
A
1
2
3
4
5
6
7
8

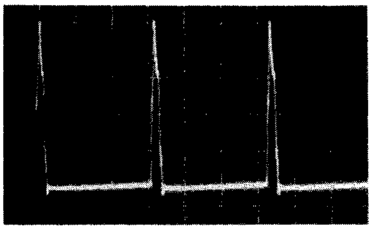
WAVEFORMS

Deflection

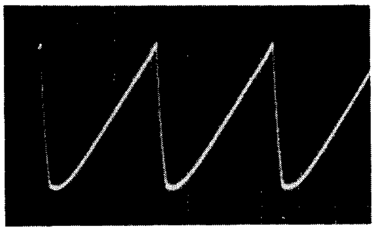
CN304-4
20V/20 μsec • div



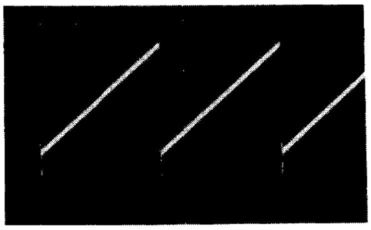
CN305-1
10V/20 μsec • div



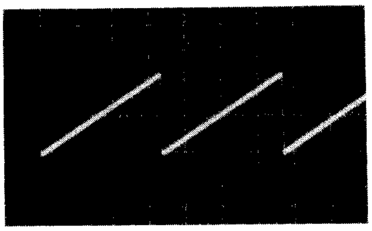
CN305-2
0.5V/20 μsec • div



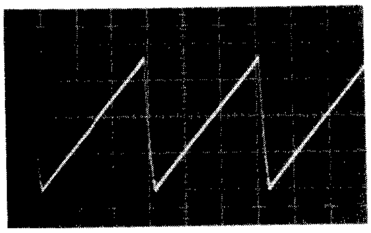
CN305-5
1V/5msec • div



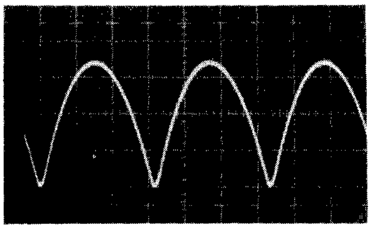
CN305-6
0.2V/5msec • div



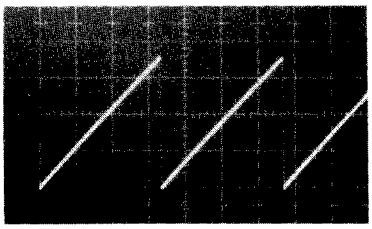
IC301-2
0.5V/20 μsec • div



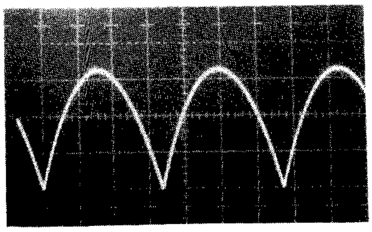
IC301-8
0.5V/20 μsec • div



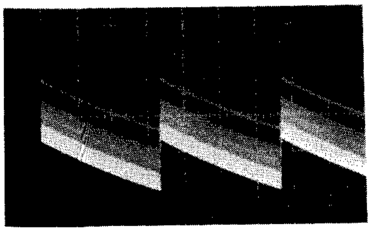
IC302-2
0.5V/5msec • div



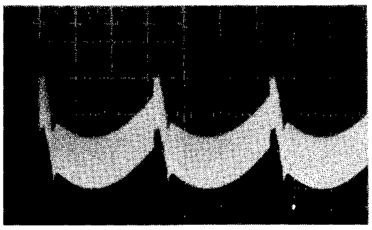
IC302-8
0.5V/5msec • div



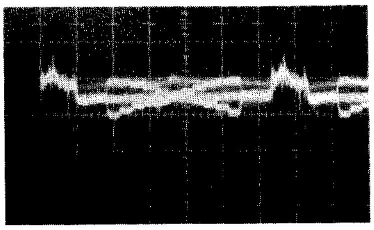
TP301
2V/5msec • div



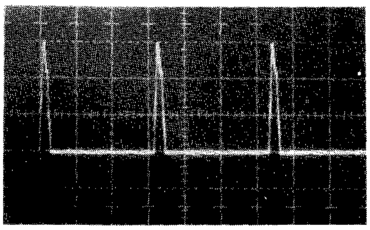
TP301
2V/20 μsec • div



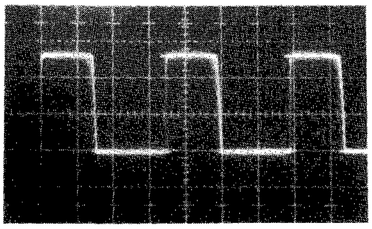
TP302
50mV/20 μsec • div



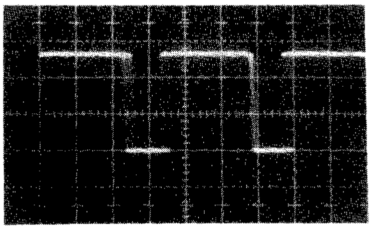
T301-2
50V/20 μsec • div



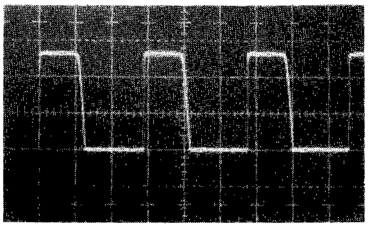
Q451 COLLECTOR
5V/5 μsec • div



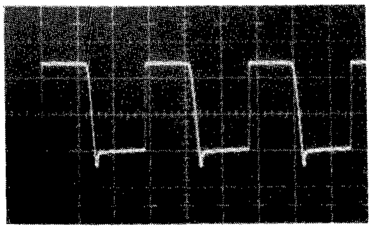
Q452 COLLECTOR
5V/5 μsec • div

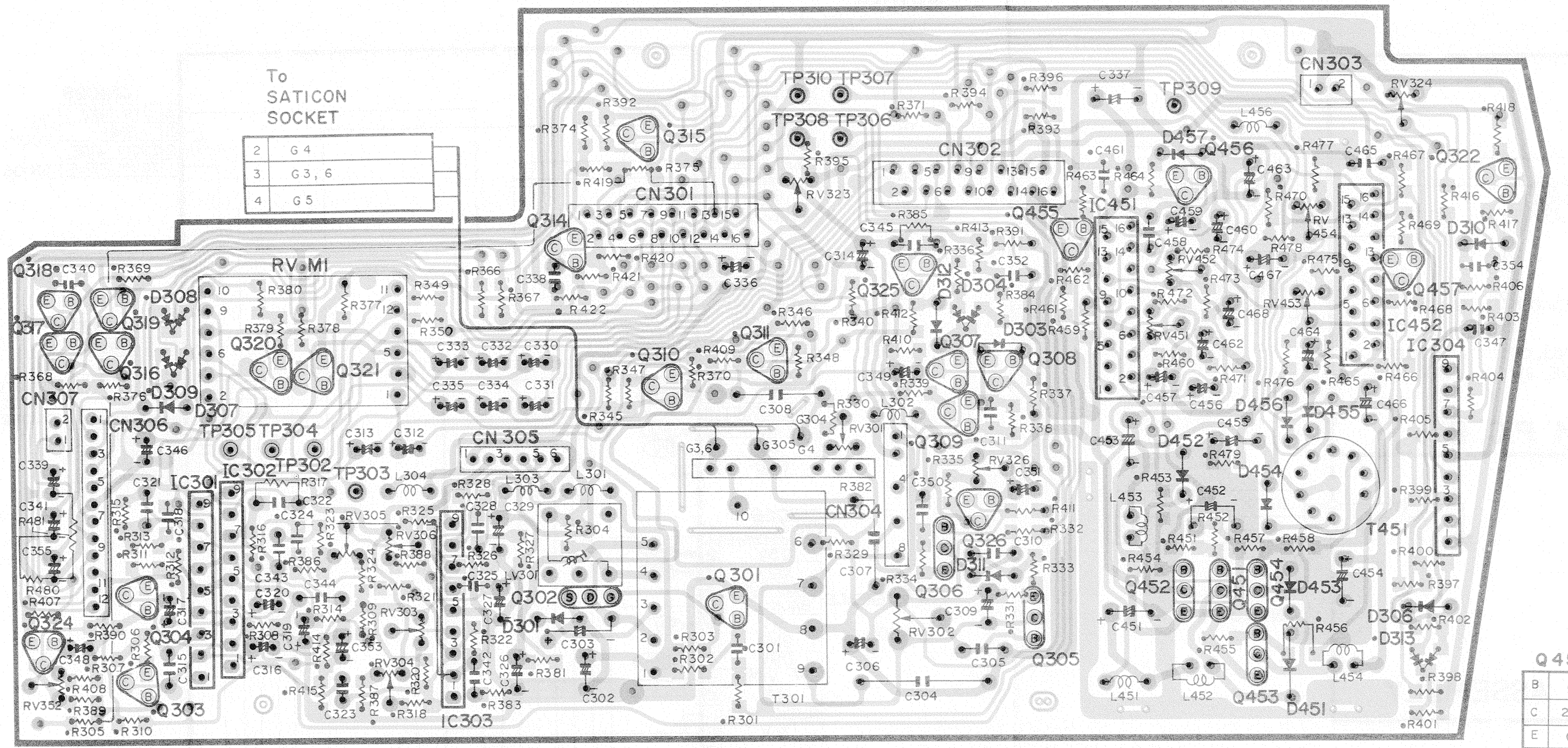


Q453 COLLECTOR
5V/5 μsec • div



Q454 COLLECTOR
10V/5 μsec • div




To SATICON SOCKET
2 G4
3 G3, 6
4 G5
CN301
CN302
CN303
CN304
CN305
CN306
CN307
TP310 TP307
TP308 TP306
TP309
TP305 TP304
TP302
TP303
RV M1
IC301
IC302
IC303
IC304
IC451
IC452
T301
T451
Q301
Q302
Q303
Q304
Q305
Q306
Q307
Q308
Q309
Q310
Q311
Q314
Q315
Q316
Q317
Q318
Q319
Q320
Q321
Q322
Q324
Q325
Q326
Q452
Q453
Q454
Q455
Q456
Q457
D301
D303
D304
D306
D307
D308
D309
D310
D311
D312
D313
D451
D452
D453
D454
D455
D456
D457
RV302
RV303
RV304
RV305
RV306
RV323
RV324
RV326
RV352
RV451
RV452
RV453
RV454
L301
L302
L303
L304
L451
L452
L453
L454
L456

DEFLECTION P.C.B

▨ Soldered side ▨ Parts side ● Through-hole

IC301

9	
8	5.0
7	5.0
6	5.0
5	0
4	3.0
3	3.0
2	4.7
1	8.8

IC302

9	
8	5.0
7	5.0
6	5.0
5	0
4	3.0
3	3.0
2	5.0
1	8.8

IC303

9	
8	5.0
7	5.0
6	5.0
5	0
4	5.0
3	5.0
2	4.7
1	8.8

IC304

9	5.0
8	1.6
7	1.7
6	1.7
5	0
4	1.9
3	1.9
2	1.2
1	5.0

IC751

15		16	
13		14	
11		12	
9		10	
7		8	
5		6	
3		4	
1		2	

IC752

15		16	
13		14	
11		12	
9		10	
7		8	
5		6	
3		4	
1		2	

Q301

B	-2.7
C	6.6
E	0

Q302

G	6.6
D	8.7
S	0

Q303

B	3.0
C	4.7
E	3.1

Q304

B	2.9
C	5.0
E	3.0

Q305

B	-10.2
C	-15.0
E	-10.5

Q306

B	4.4
C	-6.9
E	4.8

Q307

B	0
C	-3.9
E	0.2

Q308

B	-3.9
C	-5.1
E	-4.4

Q309

B	-4.3
C	-3.9
E	-4.4

Q310

B	-2.1
C	-2.3
E	-1.5

Q311

B	-2.1
C	-2.5
E	-1.5

Q314

B	0.7
C	0
E	0

Q315

B	0
C	4.8
E	0

Q316

B	8.9
C	8.9
E	8.5 LO:4.9 HI:3.3

Q317

B	8.9
C	8.9
E	8.5 LO:4.9 HI:4.9

Q318

B	8.9
C	0
E	8.5 LO:4.9 HI:4.9

Q319

B	8.9
C	0
E	8.5 LO:4.9 HI:4.9

Q320

B	9.0(8.0)
C	0(8.6)
E	9.0(8.7)

Q321

B	9.0(8.7)
C	9.0(8.0)
E	9.0(8.7)

Q322

B	1.9
C	5.0
E	1.2

Q324

B	6.2
C	8.8
E	5.5

Q325

B	4.1
C	8.8
E	4.4

Q326

B	4.1
C	8.8
E	4.4

Q456

B	11.7
C	11.7
E	10.8

Q457

B	0.7
C	7.5
E	0.2

Q751

B	
C	
E	

Q752

B	
C	
E	

Q753

B	
C	
E	

Q754

B	
C	
E	

Q455

B	0
C	2.5
E	0

CN301

1	LEVEL SET
2	LOW LIGHT
3	-D3V
4	1.8V
5	ABO
6	DARK SHADING
7	DARK SHADING
8	RED SHADING
9	RED SHADING
10	BLUE SHADING
11	BLUE SHADING
12	ABO B+
13	CP2
14	VD
15	WHD
16	VIDEO

To VIDEO CN2

CN302

1	ZOOM TELE
2	ZOOM WIDE
3	AF SET
4	INF
5	NEAR
6	IRIIS CONT
7	GND
8	9V
9	5V
10	M5V
11	D5V
12	D9V
13	12V
14	GND
15	9V
16	LOW LIGHT

To MOTHER CN1029

CN303

1	GND
2	STANDBY

To REAR CN1002

CN304

1	H	1
2	H(-D3V)	8
3	——	
4	K	7
5	——	
6	G1	6
7	——	
8	G2	5

TUBE SOCKET

CN305

1	H DEF +
2	H DEF −
3	9V
4	9V
5	V DEF +
6	V DEF −

To COIL ASSY

CN306

1	AF B+
2	M5V
3	AF ON
4	AF INF
5	AF NEAR
6	GND
7	ZOOM (+)
8	ZOOM (−)
9	DRIVE (+)
10	DRIVE (−)
11	BRAKE (+)
12	BRAKE (−)

To LENS CONNECTOR CN1081

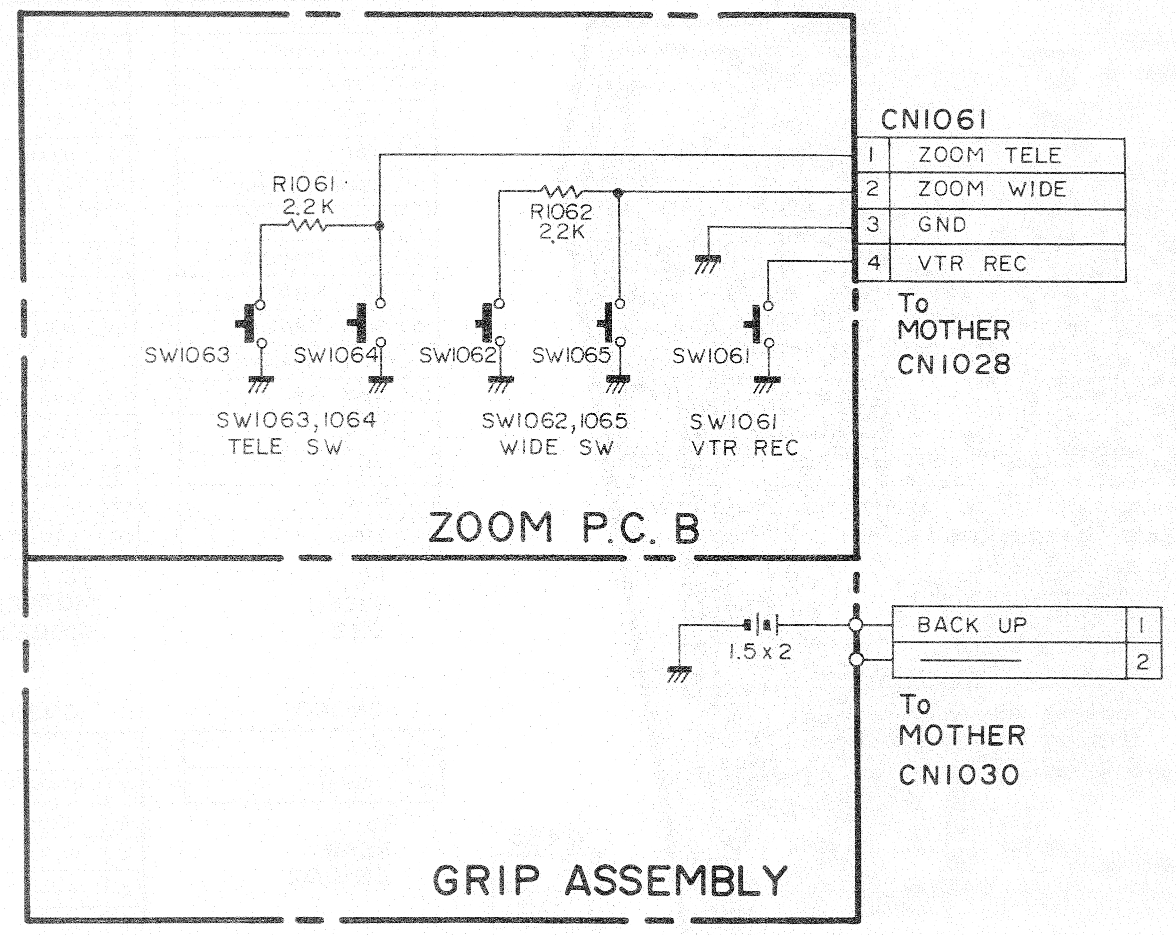
CN307

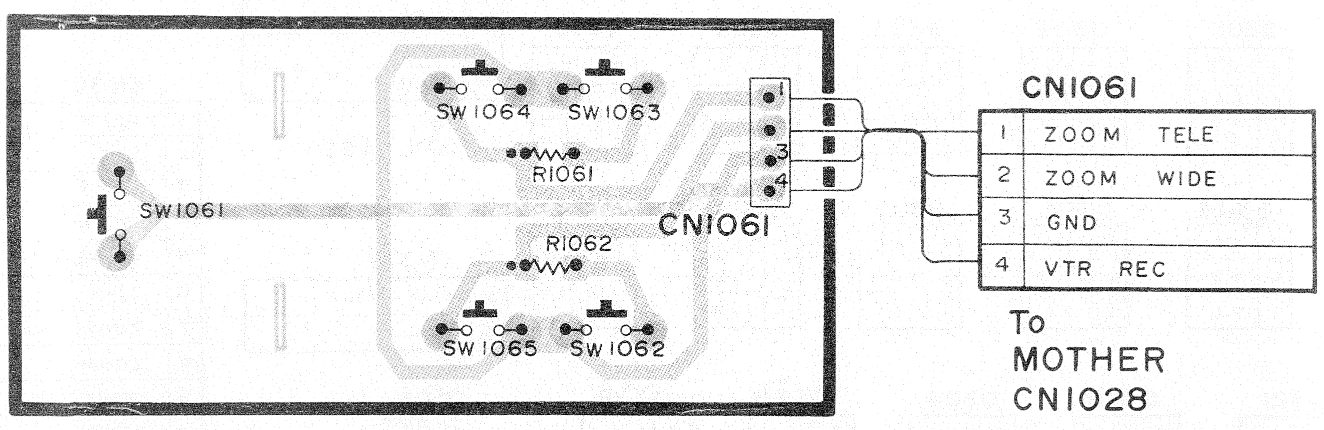
1	BIAS LIGHT
2	——

To BIAS LIGHT

]

ZOOM/GRIP

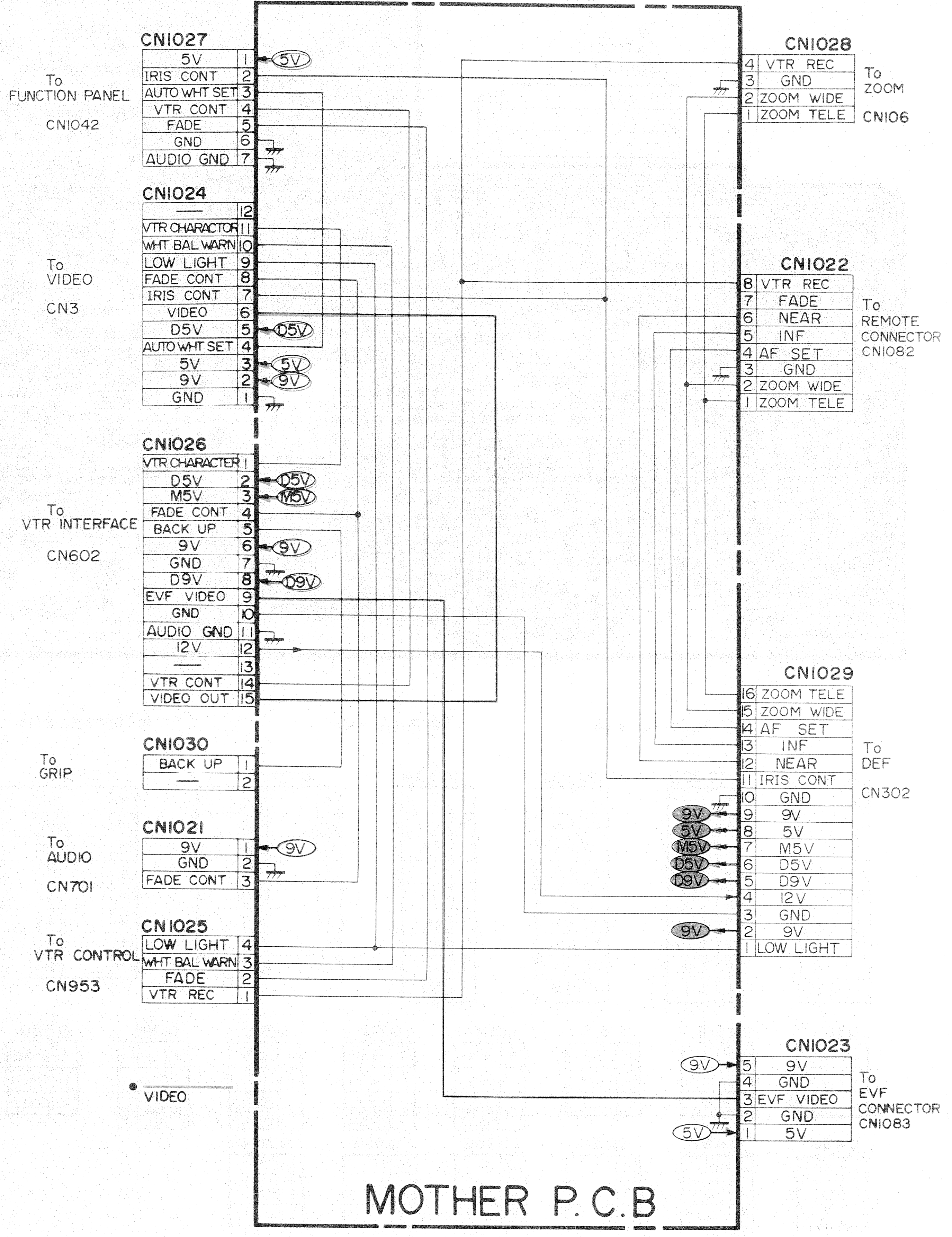

CN1061
1 ZOOM TELE
2 ZOOM WIDE
3 GND
4 VTR REC
To MOTHER CN1028
R1061 2.2K
R1062 2.2K
SW1063
SW1064
SW1062
SW1065
SW1061
SW1063,1064 TELE SW
SW1062,1065 WIDE SW
SW1061 VTR REC
ZOOM P.C. B
1.5 x 2
BACK UP 1
2
To MOTHER CN1030
GRIP ASSEMBLY


SW1064
SW1063
R1061
R1062
SW1065
SW1062
SW1061
CN1061
1
2
3
4
CN1061
1 ZOOM TELE
2 ZOOM WIDE
3 GND
4 VTR REC
To MOTHER CN1028

ZOOM P.C.B

Soldered side Parts side Through-hole

MOTHER


CN1027
1 5V
2 IRIS CONT
3 AUTO WHT SET
4 VTR CONT
5 FADE
6 GND
7 AUDIO GND
To FUNCTION PANEL CN1042
CN1024
12 —
11 VTR CHARACTOR
10 WHT BAL WARN
9 LOW LIGHT
8 FADE CONT
7 IRIS CONT
6 VIDEO
5 D5V
4 AUTO WHT SET
3 5V
2 9V
1 GND
To VIDEO CN3
CN1026
1 VTR CHARACTER
2 D5V
3 M5V
4 FADE CONT
5 BACK UP
6 9V
7 GND
8 D9V
9 EVF VIDEO
10 GND
11 AUDIO GND
12 12V
13 —
14 VTR CONT
15 VIDEO OUT
To VTR INTERFACE CN602
CN1030
1 BACK UP
2 —
To GRIP
CN1021
1 9V
2 GND
3 FADE CONT
To AUDIO CN701
CN1025
4 LOW LIGHT
3 WHT BAL WARN
2 FADE
1 VTR REC
To VTR CONTROL CN953
● VIDEO
5V
D5V
5V
9V
D5V
M5V
9V
D9V
9V
CN1028
4 VTR REC
3 GND
2 ZOOM WIDE
1 ZOOM TELE
To ZOOM CN106
CN1022
8 VTR REC
7 FADE
6 NEAR
5 INF
4 AF SET
3 GND
2 ZOOM WIDE
1 ZOOM TELE
To REMOTE CONNECTOR CN1082
CN1029
16 ZOOM TELE
15 ZOOM WIDE
14 AF SET
13 INF
12 NEAR
11 IRIS CONT
10 GND
9 9V
8 5V
7 M5V
6 D5V
5 D9V
4 12V
3 GND
2 9V
1 LOW LIGHT
To DEF CN302
9V
5V
M5V
D5V
D9V
9V
CN1023
5 9V
4 GND
3 EVF VIDEO
2 GND
1 5V
To EVF CONNECTOR CN1083
9V
5V
MOTHER P.C.B

E D C B A

1 2 3 4 5 6 7 8

CN1027

1	5V
2	IRIS CONT
3	AUTO WHT SET
4	VTR CONT
5	FADE
6	GND
7	AUDIO GND

To
FUNCTION PANEL
CN1042

CN1022

1	ZOOM TELE
2	ZOOM WIDE
3	GND
4	AF SET
5	INT
6	NEAR
7	FADE
8	VTR REC

To
REMOTE
CONNECTOR
CN1082

CN1030

1	BACK UP
2	——

CN1021

1	9V
2	GND
3	FADE CONT

To
AUDIO
CN701

CN1024

1	GND
2	9V
3	5V
4	AUTO WHT SET
5	D5V
6	VIDEO
7	IRIS CONT
8	FADE CONT
9	LOW LIGHT
10	WHT BAL WARN
11	VTR CHARACTER
12	——

To
VIDEO
CN3

CN1023

1	5V
2	GND
3	EVF VIDEO
4	GND
5	9V

To
EVF
CONNECTOR
CN1083

CN1025

1	VTR REC
2	FADE
3	WHT BAL WARN
4	LOW LIGHT

To
VTR CONTROL
CN953

CN1026

1	VTR CONT
2	D5V
3	M5V
4	FADE
5	BACK UP
6	9V
7	GND
8	D9V
9	EVF VIDEO
10	GND
11	AUDIO GND
12	12V
13	——
14	VTR CONT
15	VIDEO OUT

To
VTR INTERFACE
CN602

CN1029

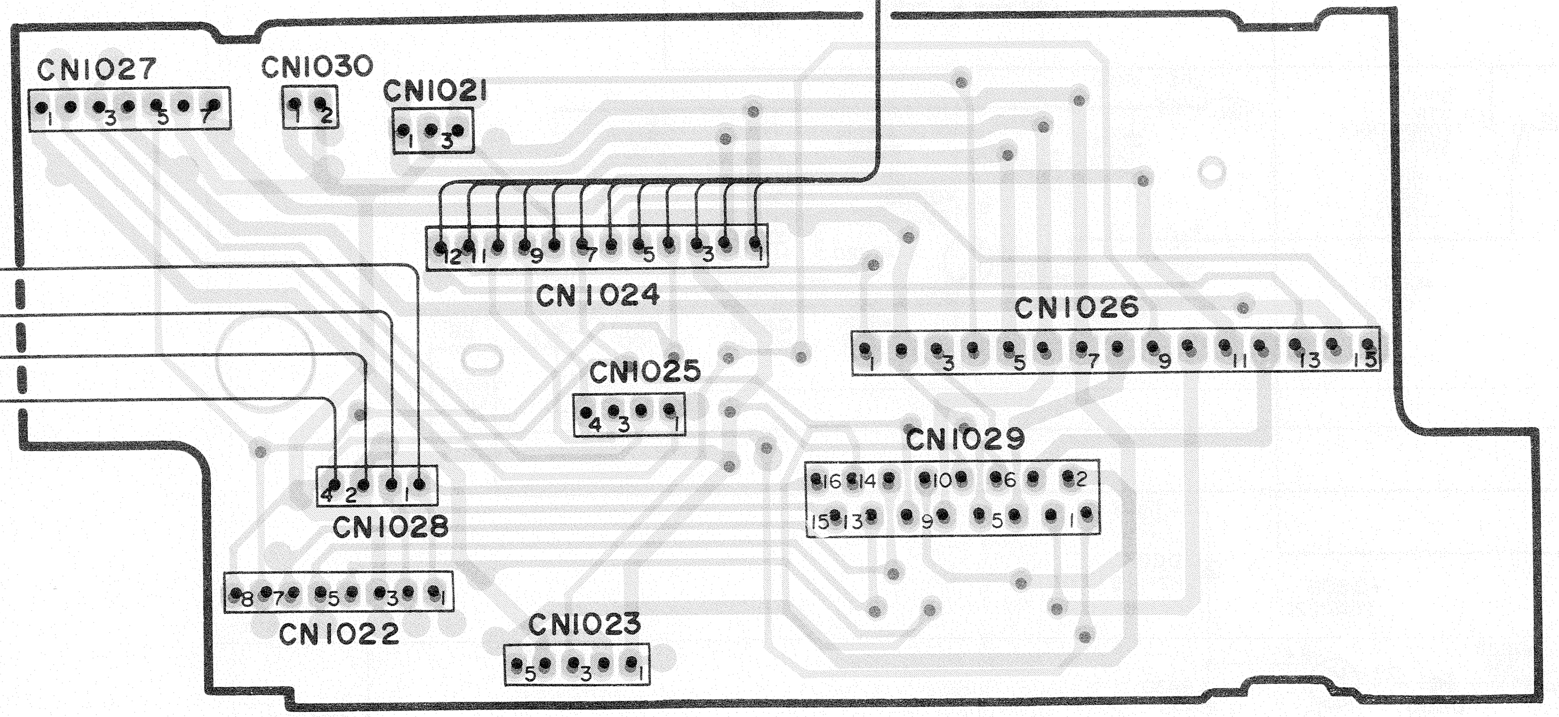
1	LOW LIGHT
2	9V
3	GND
4	12V
5	D9V
6	D5V
7	M5V
8	5V
9	9V
10	GND
11	IRIS CONT
12	NEAR
13	INF
14	AF SET
15	ZOOM WIDE
16	ZOOM TELE

To
DEF
CN302

CN1028

ZOOM TELE	1
ZOOM WIDE	2
GND	3
VTR REC	4

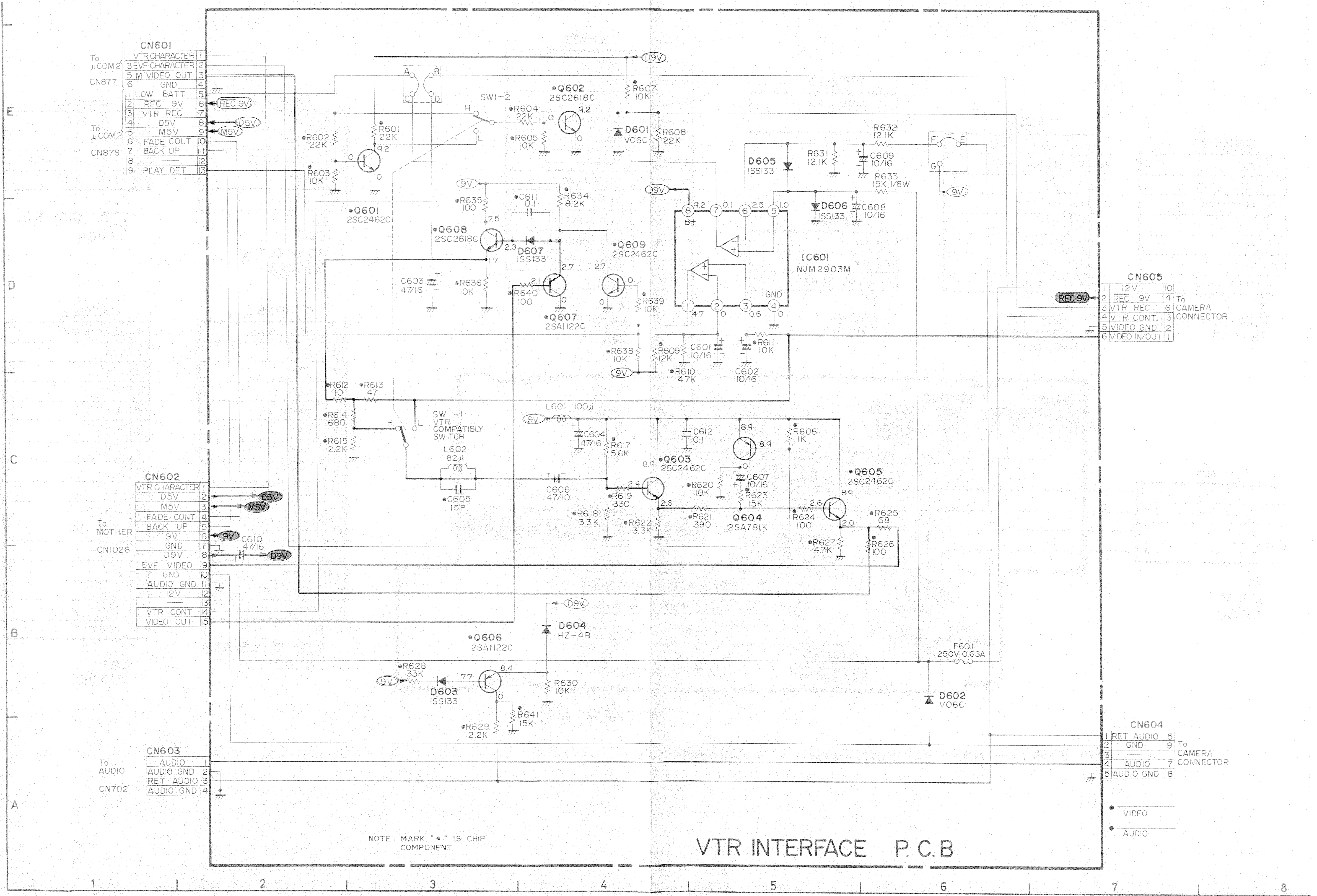
To
ZOOM
CN106


CN1027
1
3
5
7
CN1030
1
2
CN1021
1
3
12
11
9
7
5
3
1
CN1024
CN1026
1
3
5
7
9
11
13
15
CN1025
4
3
1
CN1029
16
14
10
6
2
15
13
9
5
1
4
2
1
CN1028
8
7
5
3
1
CN1022
CN1023
5
3
1

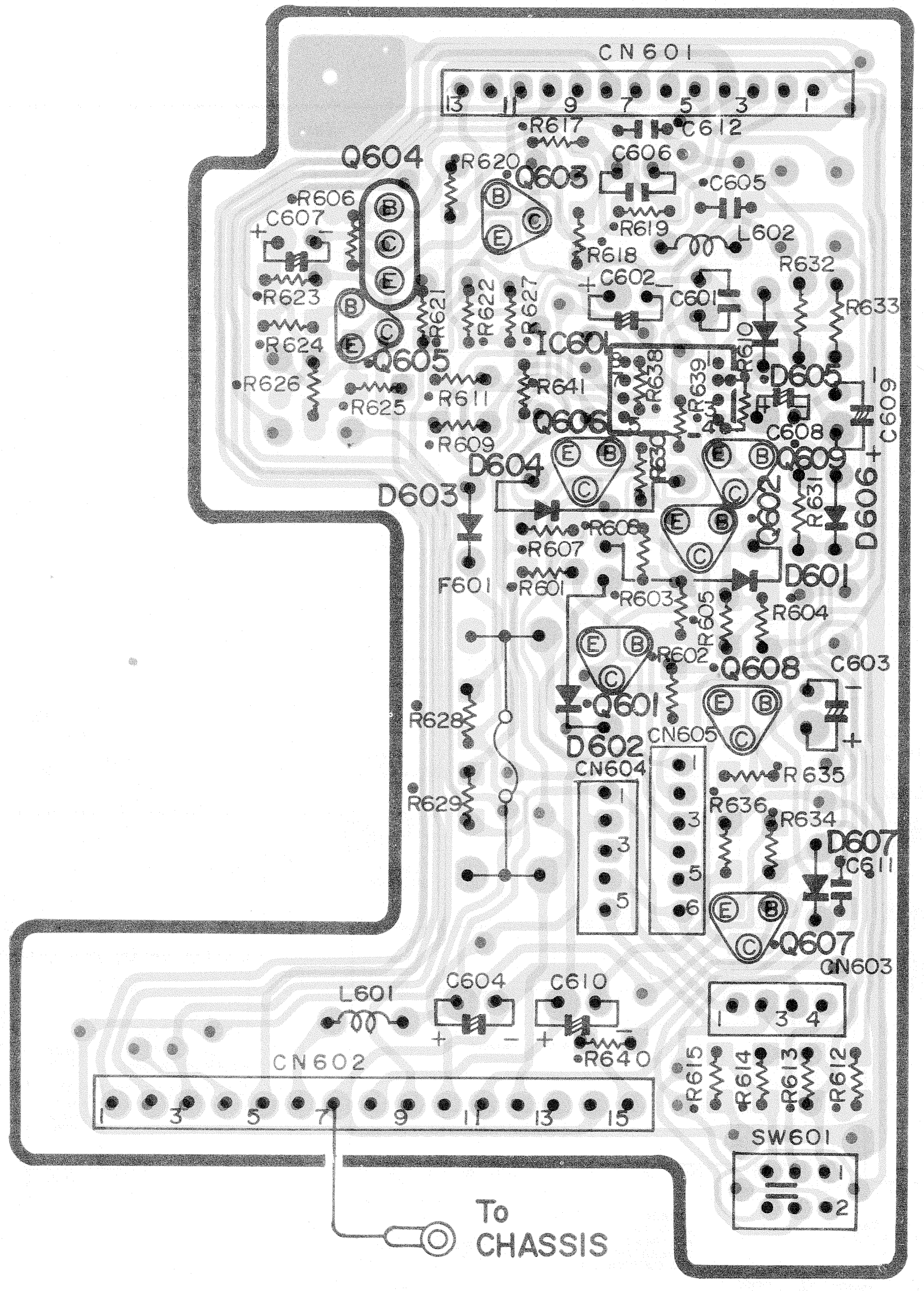
MOTHER P.C.B

▨ Soldered side ▨ Parts side ● Through-hole

VTR INTERFACE


CN601
1 VTR CHARACTER 1
3 EVF CHARACTER 2
5 M VIDEO OUT 3
6 GND 4
1 LOW BATT 5
2 REC 9V 6
3 VTR REC 7
4 D5V 8
5 M5V 9
6 FADE COUT 10
7 BACK UP 11
8 12
9 PLAY DET 13
To µCOM2 CN877
To µCOM2 CN878
REC 9V
D5V
M5V
D9V
9V
SW1-2
H
L
A B C D
Q602 2SC2618C
R604 22K
R605 10K
R607 10K
D601 V06C
R608 22K
R601 22K
R602 22K
R603 10K
Q601 2SC2462C
9.2
R632 12.1K
D605 ISS133
R631 12.1K
C609 10/16
R633 15K 1/8W
F E G
D606 ISS133
C608 10/16
R635 100
C611 0.1
R634 8.2K
Q608 2SC2618C
7.5
2.3
1.7
D607 ISS133
Q609 2SC2462C
2.7
C603 47/16
R636 10K
R640 100
2.1
Q607 2SA1122C
R639 10K
IC601 NJM2903M
B+
GND
8 7 6 5
1 2 3 4
0.1 2.5 1.0 4.7 0.6
R638 10K
R609 12K
C601 10/16
R611 10K
R610 4.7K
C602 10/16
CN605
1 12V 10
2 REC 9V 4
3 VTR REC 6
4 VTR CONT. 3
5 VIDEO GND 2
6 VIDEO IN/OUT 1
To CAMERA CONNECTOR
R612 10
R613 47
R614 680
R615 2.2K
SW1-1 VTR COMPATIBLY SWITCH
L602 82µ
C605 15P
L601 100µ
C604 47/16
R617 5.6K
C612 0.1
R606 1K
8.9
Q603 2SC2462C
C606 47/10
R619 330
2.4
R620 10K
C607 10/16
R623 15K
Q604 2SA781K
R621 390
R618 3.3K
R622 3.3K
2.6
Q605 2SC2462C
R624 100
R625 68
2.0
R627 4.7K
R626 100
CN602
VTR CHARACTER 1
D5V 2
M5V 3
FADE CONT 4
BACK UP 5
9V 6
GND 7
D9V 8
EVF VIDEO 9
GND 10
AUDIO GND 11
12V 12
13
VTR CONT 14
VIDEO OUT 15
To MOTHER CN1026
C610 47/16
D604 HZ-4B
Q606 2SA1122C
R628 33K
D603 ISS133
7.7
8.4
R630 10K
R641 15K
R629 2.2K
F601 250V 0.63A
D602 V06C
CN603
AUDIO 1
AUDIO GND 2
RET AUDIO 3
AUDIO GND 4
To AUDIO CN702
CN604
1 RET AUDIO 5
2 GND 9
3 —
4 AUDIO 7
5 AUDIO GND 8
To CAMERA CONNECTOR
VIDEO
AUDIO
VTR INTERFACE P.C.B
A B C D E
1 2 3 4 5 6 7 8

NOTE: MARK "•" IS CHIP COMPONENT.


CN601
13
11
9
7
5
3
1
Q604
R617
C612
R620
Q603
C606
R606
C605
C607
R619
L602
R618
R632
R623
C602
C601
R633
R621
R622
R627
IC601
R610
R624
Q605
R638
R639
D605
R626
R611
R641
C609
R625
Q606
C608
R609
R630
Q609
D604
R631
D603
R608
Q602
D606
R607
D601
F601
R601
R603
R605
R604
R602
Q608
C603
Q601
R628
D602
CN605
CN604
R635
R636
R634
R629
D607
C611
Q607
CN603
L601
C604
C610
R640
CN602
R615
R614
R613
R612
15
SW601
To CHASSIS

VTR INTERFACE P.C.B

▨ Soldered side

▨ Parts side

● Through- hote

IC601

8	9.2	1	4.7
7	0.1	2	0
6	2.5	3	0.6
5	1.0	4	0

CN601

1	VTR CHARACTER
2	EVF CHARACTER
3	M VIDEO OUT
4	GND
5	LOW BATT
6	REC 9V
7	VTR REC
8	D5V
9	M5V
10	FADE CONT
11	BACK UP
12	———
13	PLAY DET

To
µ COM 2
CN877 & CN878

CN603

1	AUDIO
2	AUDIO GND
3	RET AUDIO
4	AUDIO GND

To
AUDIO
CN 702

CN604

1	RET AUDIO
2	GND
3	———
4	AUDIO
5	AUDIO GND

To
CAMERA
CONNECTOR

CN602

1	VTR CHARACTER
2	D5V
3	M5V
4	FADE CONT
5	BACK UP
6	9 V
7	GND
8	D9V
9	EVF VIDEO
10	GND
11	AUDIO GND
12	12 V
13	———
14	VTR CONT
15	VIDEO OUT

To
MOTER
CN1026

CN 605

1	12 V
2	REC 9V
3	VTR REC
4	VTR CONT.
5	VIDEO GND
6	VIDEO IN / OUT

To
CAMERA
CONNECTOR

Q607

B	2.1
C	0
E	2.7

Q608

B	2.3
C	7.5
E	1.7

Q601

B	0
C	9.2
E	0

Q602

B	0
C	9.2
E	0

Q603

B	2.4
C	8.9
E	2.6

Q604

B	8.9
C	0
E	8.9

Q605

B	2.6
C	8.9
E	2.0

Q606

B	7.7
C	0
E	8.4

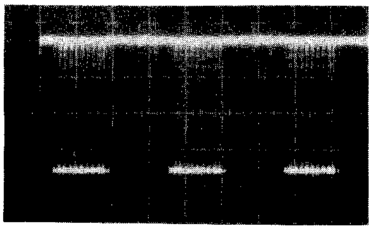
Q609

B	0
C	2.7
E	0

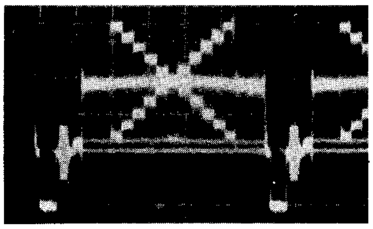
WAVEFORMS

VTR Interface (V INT)

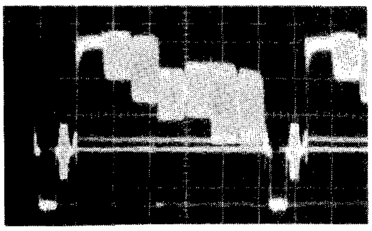
CN602-1
0.2V/20 μsec · div



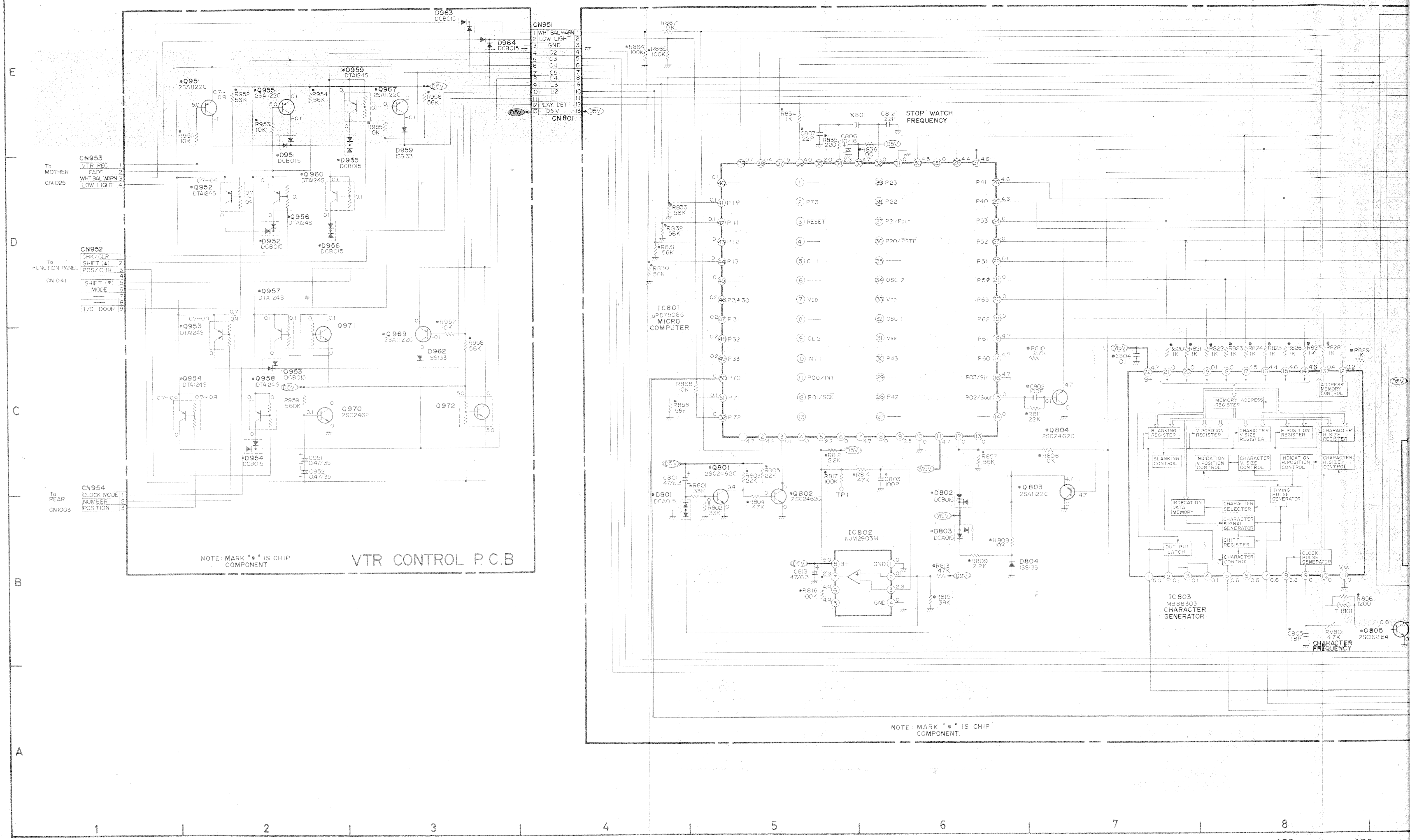
CN605-6
0.2V/10 μsec · div



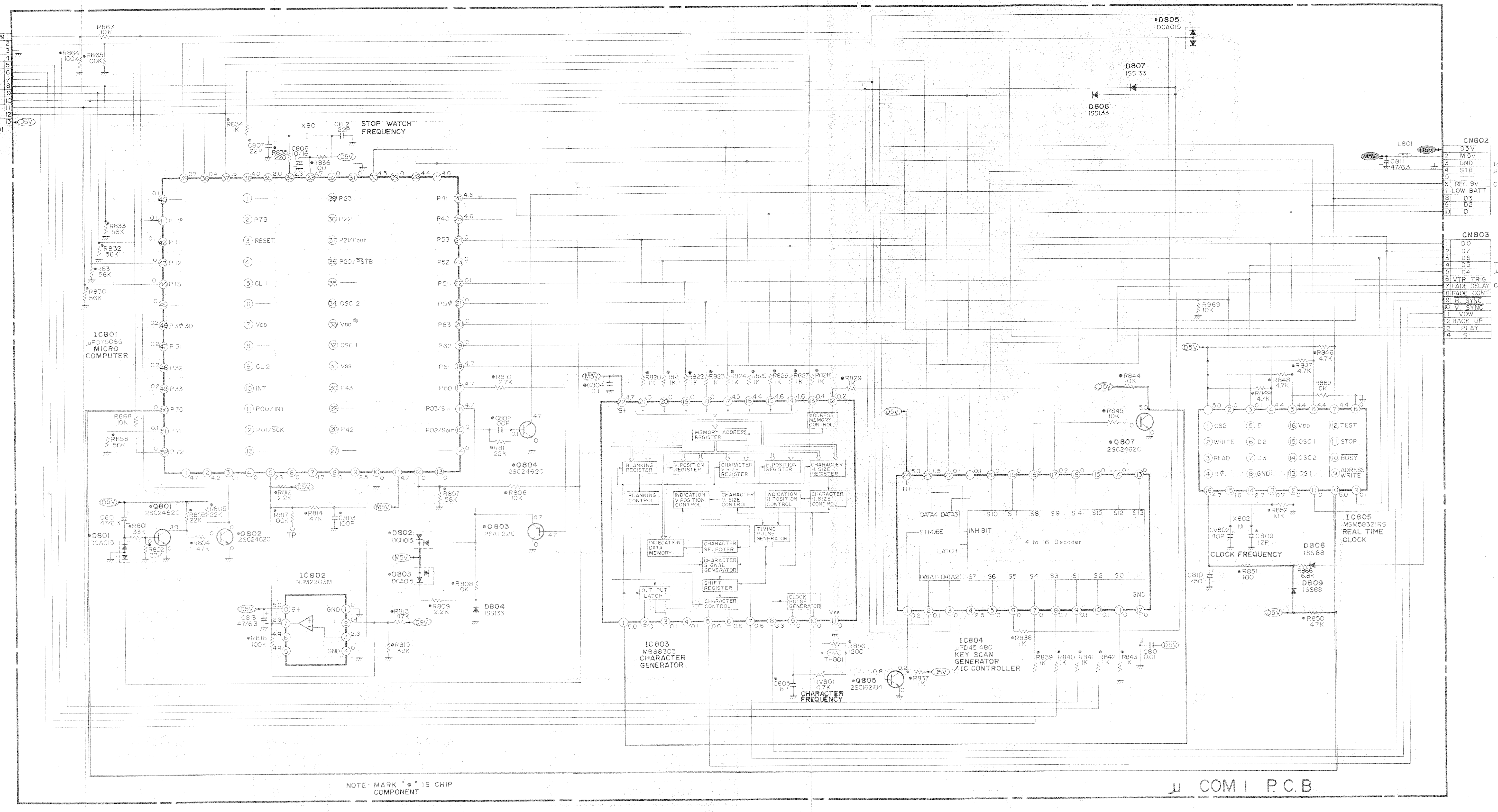
CN605-6
0.2V/10 μsec · div



CON 1/VTR CONTROL



E
D
C
B
A
1
2
3
4
5
6
7
8
D963 DCB015
D964 DCB015
CN951
1 WHT BAL WARN 1
2 LOW LIGHT 2
3 GND 3
4 C2 4
5 C3 5
6 C4 6
7 C5 7
8 L4 8
9 L3 9
10 L2 10
11 L1 11
12 PLAY DET 12
13 D5V 13
CN801
D5V
Q951 2SA1122C
Q955 2SA1122C
Q959 DTA124S
Q967 2SA1122C
R951 10K
R952 56K
R953 10K
R954 56K
R955 10K
R956 56K
D951 DCB015
D955 DCB015
D959 ISS133
CN953
To MOTHER CN1025
VTR REC 1
FADE 2
WHT BAL WARN 3
LOW LIGHT 4
Q952 DTA124S
Q956 DTA124S
Q960 DTA124S
D952 DCB015
D956 DCB015
CN952
To FUNCTION PANEL CN1041
CHK/CLR 1
SHIFT (▲) 2
POS/CHR 3
4
SHIFT (▼) 5
MODE 6
7
8
I/O DOOR 9
Q953 DTA124S
Q957 DTA124S
Q971
Q969 2SA1122C
R957 10K
R958 56K
D962 ISS133
Q954 DTA124S
Q958 DTA124S
D953 DCB015
R959 560K
Q970 2SC2462
Q972
D954 DCB015
C951 0.47/35
C952 0.47/35
CN954
To REAR CN1003
CLOCK MODE 1
NUMBER 2
POSITION 3
NOTE: MARK "●" IS CHIP COMPONENT.
VTR CONTROL P.C.B
R867 10K
R864 100K
R865 100K
R834 1K
X801
C812 22P
STOP WATCH FREQUENCY
C807 22P
R835 220
C806 10/16
R836 100
IC801 μPD7508G MICRO COMPUTER
R833 56K
R832 56K
R831 56K
R830 56K
R868 10K
R858 56K
P23
P22
P21/Pout
P20/PSTB
OSC 2
VDD
OSC 1
Vss
P43
P42
P73
RESET
CL 1
VDD
CL 2
INT I
P00/INT
P01/SCK
P1φ
P11
P12
P13
P3φ30
P31
P32
P33
P70
P71
P72
P41
P40
P53
P52
P51
P5φ
P63
P62
P61
P60
P03/Sin
P02/Sout
R810 2.7K
C802 100P
R811 22K
Q804 2SC2462C
R806 10K
R857 56K
R812 2.2K
R817 100K
R814 47K
C803 100P
TP1
Q801 2SC2462C
R805 22K
R803 22K
C801 47/6.3
R801 33K
R802 33K
R804 47K
Q802 2SC2462C
D801 DCA015
IC802 NJM2903M
C813 47/6.3
R816 100K
R813 47K
R815 39K
D9V
M5V
D802 DCB015
D803 DCA015
Q803 2SA1122C
R808 10K
R809 2.2K
D804 ISS133
M5V
C804 0.1
R820 1K
R821 1K
R822 1K
R823 1K
R824 1K
R825 1K
R826 1K
R827 1K
R828 1K
R829 1K
ADDRESS MEMORY CONTROL
MEMORY ADDRESS REGISTER
BLANKING REGISTER
V.POSITION REGISTER
CHARACTER V.SIZE REGISTER
H.POSITION REGISTER
CHARACTER H.SIZE REGISTER
BLANKING CONTROL
INDICATION V.POSITION CONTROL
CHARACTER V.SIZE CONTROL
INDICATION H.POSITION CONTROL
CHARACTER H.SIZE CONTROL
TIMING PULSE GENERATOR
INDECATION DATA MEMORY
CHARACTER SELECTER
CHARACTER SIGNAL GENERATOR
SHIFT REGISTER
OUT PUT LATCH
CHARACTER CONTROL
CLOCK PULSE GENERATOR
Vss
IC803 MB88303 CHARACTER GENERATOR
R856 1200
TH801
C805 18P
RV801 4.7K
CHARACTER FREQUENCY
Q805 2SC1621B4
NOTE: MARK "●" IS CHIP COMPONENT.


IC801
µPD7508G
MICRO COMPUTER
IC802
NJM2903M
IC803
MB88303
CHARACTER GENERATOR
IC804
µPD4514BC
KEY SCAN GENERATOR / IC CONTROLLER
IC805
MSM5832IRS
REAL TIME CLOCK
STOP WATCH FREQUENCY
CLOCK FREQUENCY
CHARACTER FREQUENCY
X801
X802
C812 22P
C807 22P
R835 220
C806 10/16
R836 100
R834 1K
R867 10K
R864 100K
R865 100K
R833 56K
R832 56K
R831 56K
R830 56K
R868 10K
R858 56K
Q801 2SC2462C
Q802 2SC2462C
Q803 2SA1122C
Q804 2SC2462C
Q805 2SC1621B4
Q807 2SC2462C
D801 DCA015
D802 DCB015
D803 DCA015
D804 1SS133
D805 DCA015
D806 1SS133
D807 1SS133
D808 1SS88
D809 1SS88
C801 47/6.3
R801 33K
R802 33K
R803 22K
R804 47K
R805 22K
R812 2.2K
R817 100K
R814 47K
C803 100P
TP1
C813 47/6.3
R816 100K
R813 47K
R815 39K
R809 2.2K
R808 10K
R810 2.7K
C802 100P
R811 22K
R857 56K
R806 10K
C804 0.1
R820 1K
R821 1K
R822 1K
R823 1K
R824 1K
R825 1K
R826 1K
R827 1K
R828 1K
R829 1K
R856 1200
TH801
RV801 4.7K
C805 18P
R837 1K
R838 1K
R839 1K
R840 1K
R841 1K
R842 1K
R843 1K
C801 0.01
R844 10K
R845 10K
R969 10K
R846 4.7K
R847 4.7K
R848 4.7K
R849 4.7K
R869 10K
R852 10K
CV802 40P
C809 12P
C810 1/50
R851 100
R866 6.8K
R850 4.7K
L801
C811 47/6.3
D5V
M5V
D9V
P1φ
P11
P12
P13
P3φ30
P31
P32
P33
P70
P71
P72
P73
RESET
CL1
VDD
CL2
INT1
P00/INT
P01/SCK
P23
P22
P21/Pout
P20/PSTB
OSC2
OSC1
Vss
P43
P42
P41
P40
P53
P52
P51
P5φ
P63
P62
P61
P60
P03/Sin
P02/Sout
ADDRESS MEMORY CONTROL
MEMORY ADDRESS REGISTER
BLANKING REGISTER
V.POSITION REGISTER
CHARACTER V.SIZE REGISTER
H.POSITION REGISTER
CHARACTER H.SIZE REGISTER
BLANKING CONTROL
INDICATION V.POSITION CONTROL
CHARACTER V.SIZE CONTROL
INDICATION H.POSITION CONTROL
CHARACTER H.SIZE CONTROL
TIMING PULSE GENERATOR
INDECATION DATA MEMORY
CHARACTER SELECTER
CHARACTER SIGNAL GENERATOR
SHIFT REGISTER
OUT PUT LATCH
CHARACTER CONTROL
CLOCK PULSE GENERATOR
DATA4 DATA3
STROBE
INHIBIT
LATCH
DATA1 DATA2
4 to 16 Decoder
S10 S11 S8 S9 S14 S15 S12 S13
S7 S6 S5 S4 S3 S1 S2 S0
GND
CS2
WRITE
READ
Dφ
D1
D2
D3
GND
VDD
OSC1
OSC2
CS1
TEST
STOP
BUSY
ADRESS WRITE
CN802
D5V
M 5V
GND
STB
REC 9V
LOW BATT
D3
D2
D1
To µ COM 2 CN875
CN803
D0
D7
D6
D5
D4
VTR TRIG
FADE DELAY
FADE CONT
H SYNC
V SYNC
VOW
BACK UP
PLAY
S1
To µ COM 2 CN876

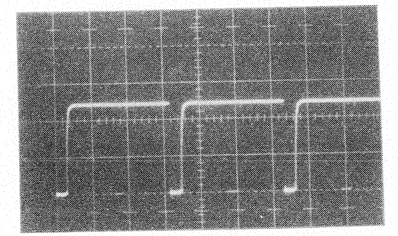
NOTE: MARK "●" IS CHIP COMPONENT.

µ COM 1 P.C.B

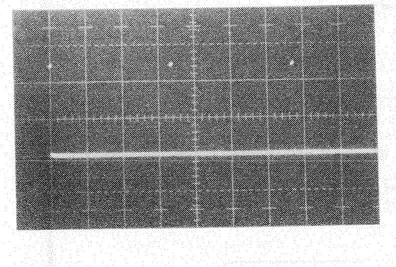
WAVEFORMS

μCOM-1

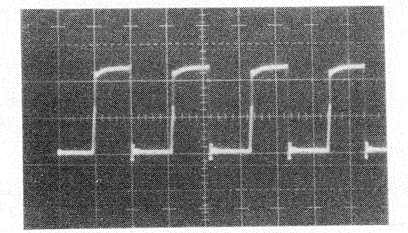
Q881 COLLECTOR
2V/20 μsec・div



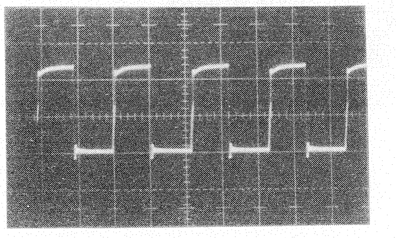
Q883 COLLECTOR
2V/5msec・div



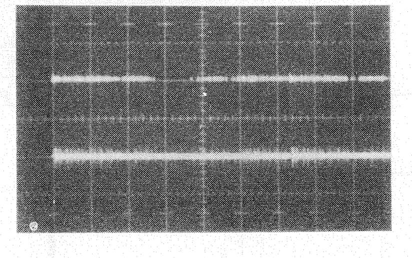
IC802-7 (POWER SAVE)
2V/2 μsec・div



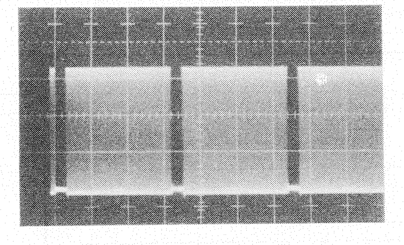
IC802-7 (NORM)
2V/2 μsec・div



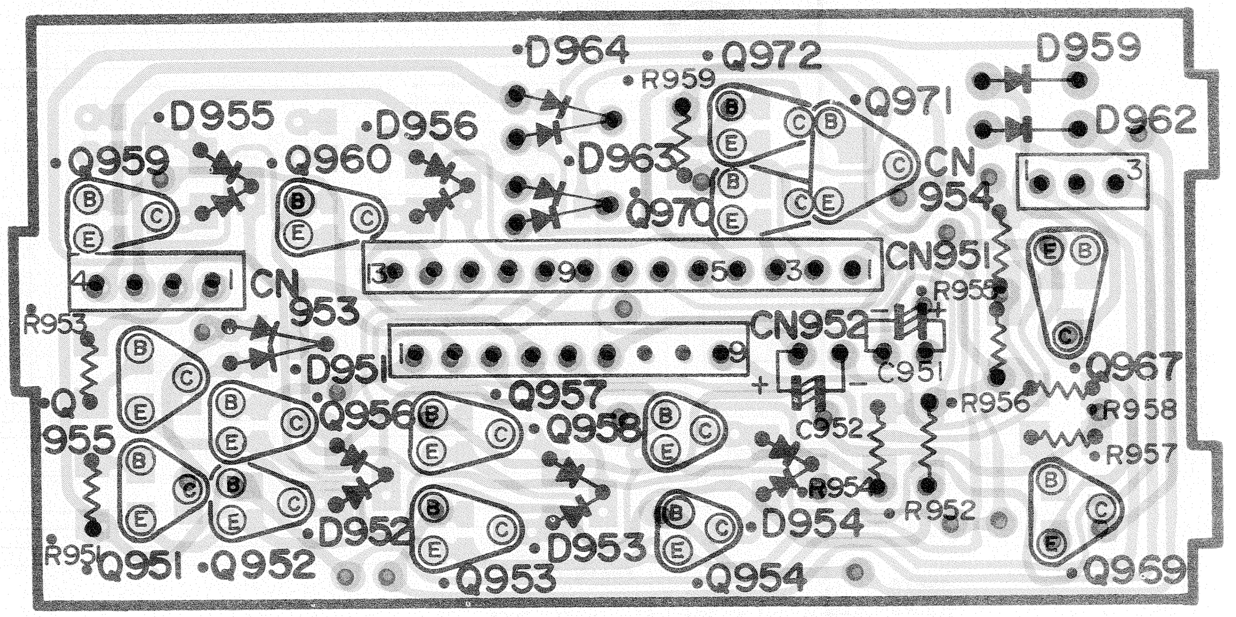
IC803-5
2V/10 μsec・div



IC803-10
1V/20 μsec・div



VTR CONTROL


D964
Q972
D959
R959
D955
D956
Q971
D962
Q959
Q960
D963
CN954
1
3
Q970
CN951
4
1
CN953
3
9
5
3
1
R955
R953
CN952
D951
1
9
C951
Q967
Q955
Q957
R956
R958
Q956
Q958
C952
R957
R954
D952
D953
D954
R952
R951
Q951
Q952
Q953
Q954
Q969
B
C
E

VTR CONTROL P.C.B

CN952

1	CHK / CLR
2	SHIFT (▶)
3	POS / CHR
4	———
5	SHIFT (◀)
6	MODE
7	———
8	———
9	I/O DOOR

To
FUNCTION PANEL
CN1041

CN953

1	VTR REC
2	FADE
3	WHT BAL WARN
4	LOW LIGHT

To
MOTHER
CN1025

CN954

1	CLOCK MODE
2	NUMBER
3	POSITION

To
REAR
CN1003

CN951

1	WHT BAL WARN
2	LOW LIGHT
3	GND
4	C2
5	C3
6	C4
7	C5
8	L4
9	L3
10	L2
11	L1
12	PLAY DET
13	D5V

To
μ COM1
CN801

Q951

B	5.0
C	−1
E	0.7～0.9

Q952

B	0.7～0.9
C	0
E	0.7～0.9

Q953

B	0.7～0.9
C	0
E	0.7～0.9

Q954

B	0.7～0.9
C	0
E	0.7～0.9

Q955

B	5.0
C	−0.1
E	0.1

Q956

B	0.1
C	0
E	0.1

Q957

B	0.1
C	0
E	0.1

Q960

B	0.1
C	−0.1
E	0.1

Q967

B	0.1
C	−0.1
E	0

Q969

B	−0.1
C	0
E	0

Q970

B	0.1
C	0
E	0

Q971

B	0
C	0.1
E	0

Q958

B	0.1
C	0
E	0.1

Q959

B	0.1
C	0
E	0.1

Q972

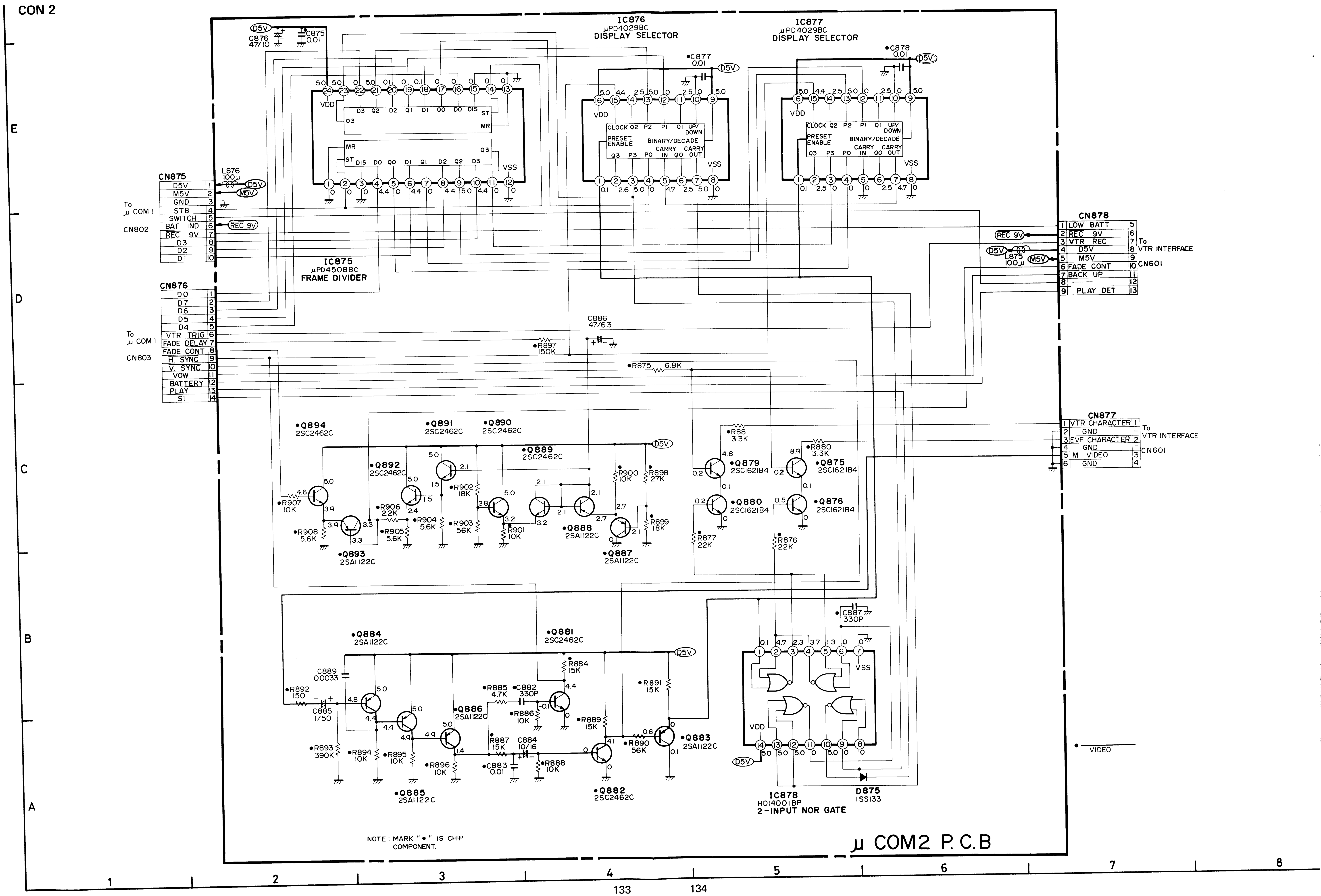
B	5.0
C	0
E	5.0

▨ Soldered side

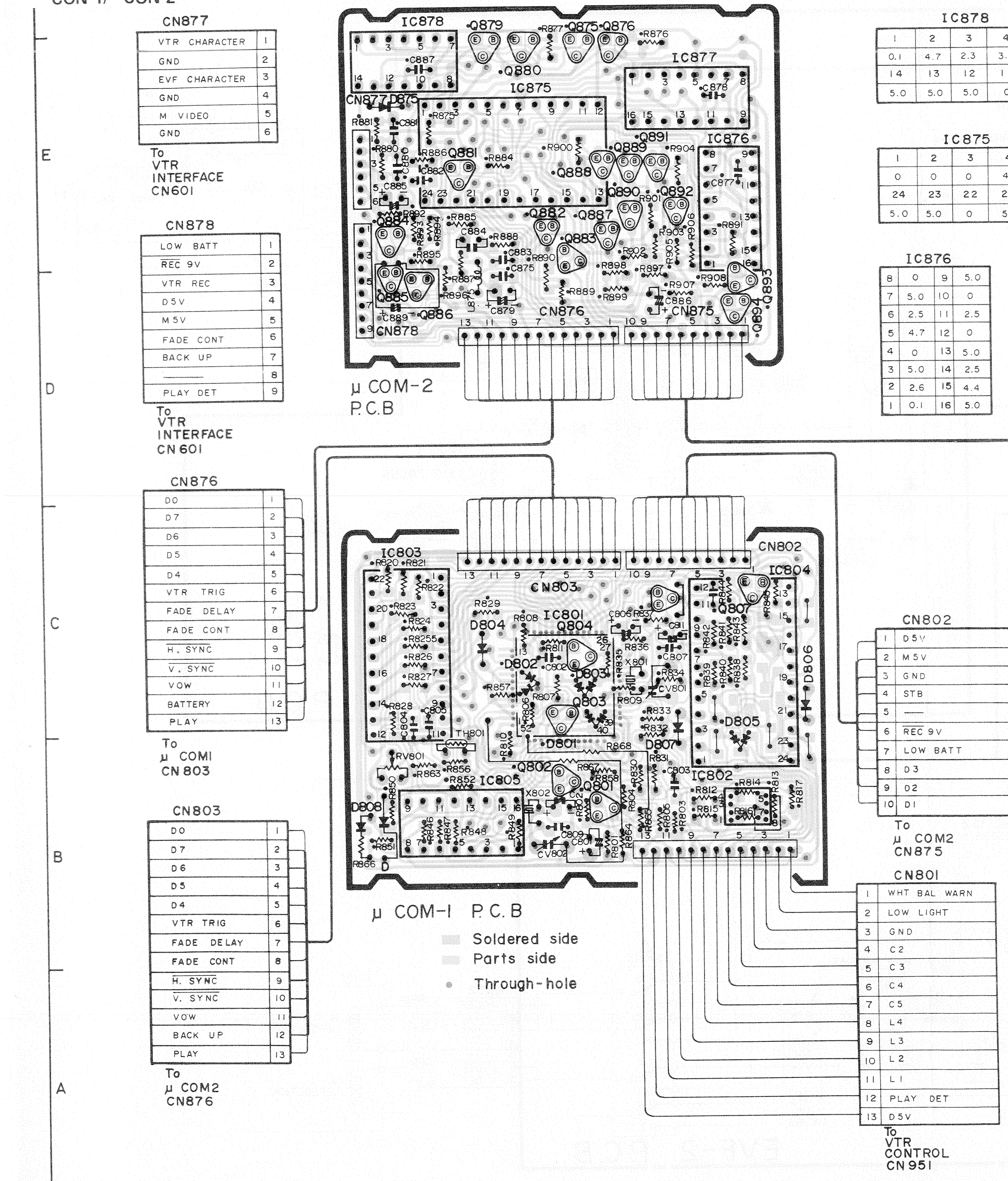
▨ Parts side

● Through-hole

CON 2


IC875
μPD4508BC
FRAME DIVIDER
IC876
μPD4029BC
DISPLAY SELECTOR
IC877
μPD4029BC
DISPLAY SELECTOR
IC878
HD14001BP
2-INPUT NOR GATE
D875
1SS133
CN875
D5V
M5V
GND
STB
SWITCH
BAT IND
REC 9V
D3
D2
D1
To μ COM I
CN802
CN876
D0
D7
D6
D5
D4
VTR TRIG
FADE DELAY
FADE CONT
H. SYNC
V. SYNC
VOW
BATTERY
PLAY
S1
To μ COM I
CN803
CN878
LOW BATT
REC 9V
VTR REC
D5V
M5V
FADE CONT
BACK UP
PLAY DET
To VTR INTERFACE
CN601
CN877
VTR CHARACTER
GND
EVF CHARACTER
GND
M VIDEO
GND
To VTR INTERFACE
CN601
L876 100μ
L875 100μ
C876 47/10
C875 0.01
C877 0.01
C878 0.01
C886 47/6.3
R897 150K
R875 6.8K
Q894 2SC2462C
Q891 2SC2462C
Q890 2SC2462C
Q889 2SC2462C
Q892 2SC2462C
Q893 2SA1122C
Q888 2SA1122C
Q887 2SA1122C
Q879 2SC1621B4
Q875 2SC1621B4
Q880 2SC1621B4
Q876 2SC1621B4
Q884 2SA1122C
Q881 2SC2462C
Q886 2SA1122C
Q885 2SA1122C
Q882 2SC2462C
Q883 2SA1122C
C887 330P
C889 0.0033
C885 1/50
R892 150
R893 390K
R894 10K
R895 10K
R896 10K
R885 4.7K
C882 330P
R886 10K
R884 15K
R887 15K
C884 10/16
C883 0.01
R888 10K
R889 15K
R890 56K
R891 15K
R907 10K
R908 5.6K
R906 2.2K
R905 5.6K
R904 5.6K
R902 18K
R903 56K
R901 10K
R900 10K
R898 27K
R899 18K
R881 3.3K
R880 3.3K
R877 22K
R876 22K
VIDEO
NOTE : MARK "•" IS CHIP COMPONENT.
μ COM2 P.C.B
E
D
C
B
A
1
2
3
4
5
6
7
8

CON 1/ CON 2


IC878
Q879
Q875
Q876
Q880
IC877
IC875
IC876
CN877
D875
CN878
CN876
CN875
Q881
Q882
Q883
Q884
Q885
Q886
Q887
Q888
Q889
Q890
Q891
Q892
Q893
Q894
µ COM-2
P.C.B
IC803
IC801
IC804
IC802
IC805
CN803
CN802
CN801
Q801
Q802
Q803
Q804
Q805
Q807
D801
D802
D804
D805
D806
D807
D808
X801
X802
TH801
RV801
CV801
CV802
µ COM-I P.C.B
▨ Soldered side
▨ Parts side
● Through-hole
A
B
C
D
E
1
2
3
4

CN877

VTR CHARACTER	1
GND	2
EVF CHARACTER	3
GND	4
M VIDEO	5
GND	6

To
VTR
INTERFACE
CN601

CN878

LOW BATT	1
$\overline{\text{REC}}$ 9V	2
VTR REC	3
D5V	4
M5V	5
FADE CONT	6
BACK UP	7
———	8
PLAY DET	9

To
VTR
INTERFACE
CN601

CN876

D0	1
D7	2
D6	3
D5	4
D4	5
VTR TRIG	6
FADE DELAY	7
FADE CONT	8
$\overline{\text{H. SYNC}}$	9
$\overline{\text{V. SYNC}}$	10
VOW	11
BATTERY	12
PLAY	13

To
µ COM1
CN803

CN803

D0	1
D7	2
D6	3
D5	4
D4	5
VTR TRIG	6
FADE DELAY	7
FADE CONT	8
$\overline{\text{H. SYNC}}$	9
$\overline{\text{V. SYNC}}$	10
VOW	11
BACK UP	12
PLAY	13

To
µ COM2
CN876

CN802

1	D5V
2	M5V
3	GND
4	STB
5	——
6	$\overline{\text{REC}}$ 9V
7	LOW BATT
8	D3
9	D2
10	D1

To
µ COM2
CN875

CN875

1	D5V
2	M5V
3	GND
4	STB
5	SWITCH
6	BAT IND
7	$\overline{\text{REC}}$ 9V
8	D3
9	D2
10	D1

To
µ COM1
CN 802

CN801

1	WHT BAL WARN
2	LOW LIGHT
3	GND
4	C2
5	C3
6	C4
7	C5
8	L4
9	L3
10	L2
11	L1
12	PLAY DET
13	D5V

To
VTR
CONTROL
CN951

IC878

1	2	3	4	5	6	7
0.1	4.7	2.3	3.7	1.3	0	0
14	13	12	11	10	9	8
5.0	5.0	5.0	0	5.0	0	0

IC877

1	2	3	4	5	6	7	8
0.1	2.5	0	0	0	2.5	4.7	0
16	15	14	13	12	11	10	9
5.0	4.4	2.5	5.0	0	2.5	0	5.0

IC875

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	4.4	0	4.4	0	4.4	5.0	4.4	0	0
24	23	22	21	20	19	18	17	16	15	14	13
5.0	5.0	0	5.0	0.1	0	0.1	0	0	0	0	0

Q875

B	0.2
C	8.9
E	0.1

Q876

B	0.5
C	0.1
E	0

Q879

B	0.2
C	4.8
E	0.1

Q880

B	0.2
C	0.1
E	0

IC876

8	0	9	5.0
7	5.0	10	0
6	2.5	11	2.5
5	4.7	12	0
4	0	13	5.0
3	5.0	14	2.5
2	2.6	15	4.4
1	0.1	16	5.0

IC803

22	4.7	1	5.0
21	0	2	0.1
20	0	3	0.1
19	0.1	4	0.1
18	0	5	0.6
17	4.5	6	0.6
16	4.4	7	0.6
15	4.6	8	3.3
14	4.6	9	0
13	0.4	10	0
12	0.2	11	0

IC804

12	0	13	0
11	0	14	0
10	0.1	15	0
9	0.1	16	0
8	0.7	17	0.2
7	0	18	0
6	0	19	0
5	0	20	0
4	2.5	21	0.1
3	0.1	22	0
2	0.1	23	1.5
1	0.2	24	5.0

Q881

B	−0.1
C	4.4
E	0

Q882

B	0
C	4.1
E	0

Q883

B	0.6
C	0.1
E	0

Q884

B	4.8
C	4.4
E	5.0

Q885

B	4.4
C	4.9
E	5.0

Q886

B	4.9
C	1.4
E	5.0

Q887

B	2.1
C	0
E	2.7

Q888

B	2.1
C	2.1
E	2.7

Q889

B	2.1
C	2.1
E	3.2

Q890

B	3.8
C	5.0
E	3.2

Q891

B	2.1
C	5.0
E	1.5

Q892

B	1.5
C	5.0
E	2.4

IC805

9	10	11	12	13	14	15	16
0.1	5.0	0	0	0.7	2.7	1.6	4.7
8	7	6	5	4	3	2	1
0	4.4	4.4	4.4	4.4	0.1	0	5.0

Q893

B	3.3
C	3.3
E	3.9

Q894

B	4.6
C	5.0
E	3.9

IC802

4	0	5	4.9
3	2.3	6	4.9
2	0.1	7	2.3
1	0	8	5.0

IC801

1	4.7	14	0	27	4.6	40	0.1
2	4.2	15	0	28	4.4	41	0.1
3	0.1	16	4.7	29	0	42	0.1
4	0	17	4.7	30	4.5	43	0
5	2.3	18	4.7	31	0	44	0
6	0	19	0	32	0	45	0
7	4.7	20	0	33	4.7	46	0.2
8	0	21	0	34	2.3	47	0.2
9	2.5	22	0.1	35	2.0	48	0.2
10	0	23	0	36	4.0	49	0.2
11	4.7	24	0	37	1.5	50	0
12	0	25	4.6	38	0.4	51	0.1
13	0	26	4.6	39	0.7	52	0

Q801

B	0
C	3.9
E	0

Q802

B	0
C	0
E	0

Q803

B	4.7
C	0
E	4.7

Q804

B	0.1
C	4.7
E	0

Q805

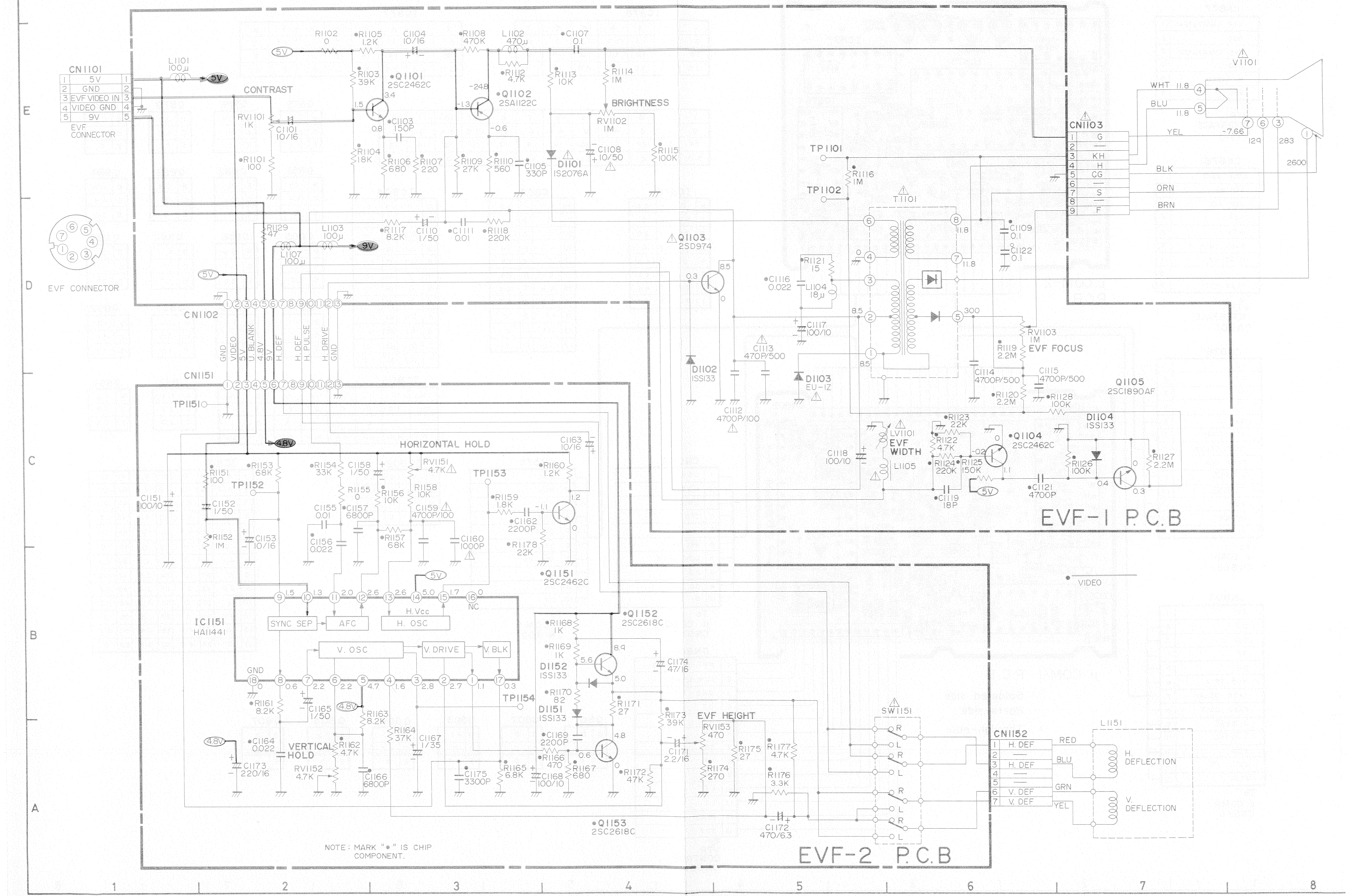
B	0.8
C	0.2
E	0

Q807

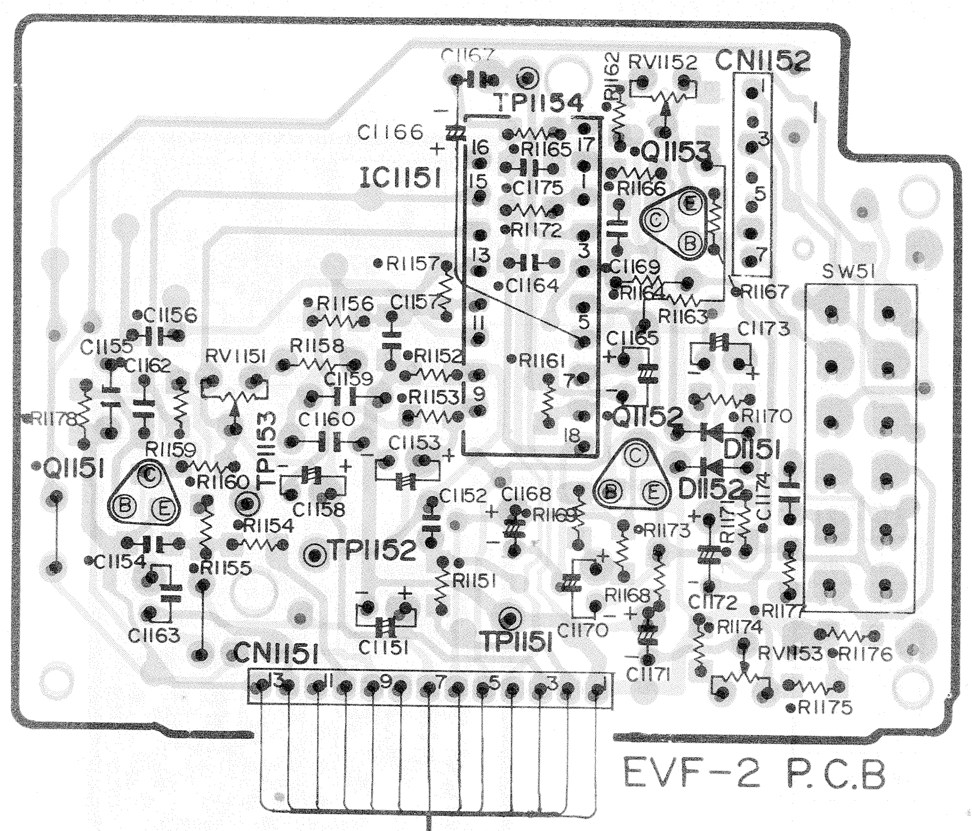
B	0
C	5.0
E	0

5
6
7
8

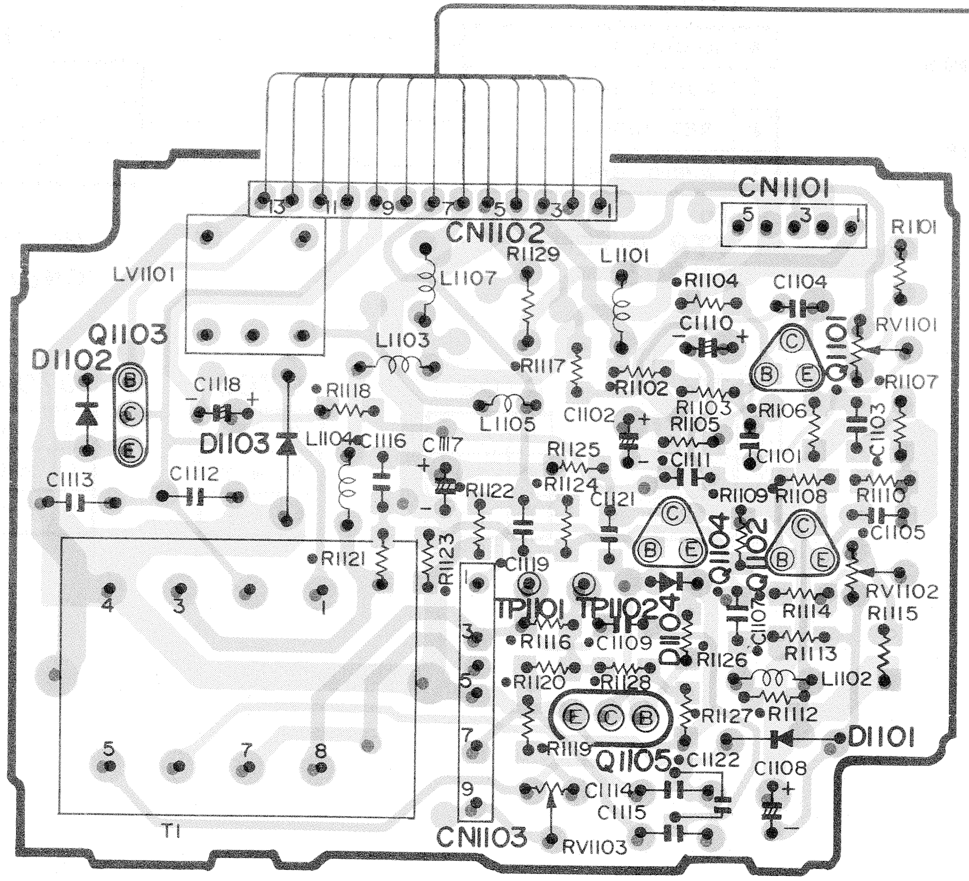
ELECTRONIC VIEWFINDER


CN1101
1 5V
2 GND
3 EVF VIDEO IN
4 VIDEO GND
5 9V
EVF CONNECTOR
EVF CONNECTOR
L1101 100μ
5V
CONTRAST
RV1101 1K
C1101 10/16
R1101 100
R1102 0
R1105 1.2K
C1104 10/16
R1103 39K
Q1101 2SC2462C
C1103 150P
R1104 18K
R1106 680
R1107 220
R1108 470K
L1102 470μ
R1112 4.7K
Q1102 2SA1122C
R1109 27K
R1110 560
C1105 330P
C1107 0.1
R1113 10K
R1114 1M
BRIGHTNESS
RV1102 1M
C1108 10/50
D1101 1S2076A
R1115 100K
V1101
WHT 11.8
BLU 11.8
YEL -7.66
129
283
2600
CN1103
1 G
2 —
3 KH
4 H
5 CG
6 —
7 S
8 —
9 F
BLK
ORN
BRN
TP1101
TP1102
R1116 1M
T1101
R1129 47
L1103 100μ
9V
R1117 8.2K
C1110 1/50
C1111 0.01
R1118 220K
L1107 100μ
Q1103 2SD974
R1121 15
C1116 0.022
L1104 18μ
C1109 0.1
C1122 0.1
5V
CN1102
GND
VIDEO
5V
U. BLANK
4.8V
9V
H. DEF
H. DEF
H. PULSE
H. DRIVE
GND
C1117 100/10
C1113 470P/500
D1102 1SS133
D1103 EU-1Z
C1112 4700P/100
RV1103 1M
EVF FOCUS
R1119 2.2M
C1114 4700P/500
C1115 4700P/500
R1120 2.2M
R1128 100K
Q1105 2SC1890AF
CN1151
TP1151
4.8V
HORIZONTAL HOLD
C1163 10/16
LV1101 EVF WIDTH
L1105
C1118 100/10
R1123 22K
R1122 4.7K
R1124 220K
R1125 150K
Q1104 2SC2462C
C1119 18P
C1121 4700P
D1104 1SS133
R1126 100K
R1127 2.2M
EVF-1 P.C.B
C1151 100/10
R1151 100
C1152 1/50
R1152 1M
TP1152
R1153 68K
C1153 10/16
R1154 33K
C1158 1/50
R1155 0
C1155 0.01
C1156 0.022
C1157 6800P
R1156 10K
RV1151 4.7K
R1158 10K
C1159 4700P/100
R1157 68K
C1160 1000P
TP1153
R1160 1.2K
R1159 1.8K
C1162 2200P
R1178 22K
Q1151 2SC2462C
5V
IC1151 HA11441
SYNC SEP
AFC
H. OSC
H.Vcc
NC
V. OSC
V. DRIVE
V. BLK
GND
R1161 8.2K
C1165 1/50
4.8V
R1163 8.2K
R1164 37K
C1167 1/35
C1164 0.022
VERTICAL HOLD
R1162 4.7K
RV1152 4.7K
C1166 6800P
C1173 220/16
C1175 3300P
R1165 6.8K
TP1154
R1168 1K
R1169 1K
D1152 1SS133
Q1152 2SC2618C
C1174 47/16
R1170 82
D1151 1SS133
R1171 27
C1169 2200P
R1166 470
C1168 100/10
R1167 680
R1172 47K
Q1153 2SC2618C
R1173 39K
EVF HEIGHT
RV1153 470
C1171 2.2/16
R1174 270
R1175 27
R1177 4.7K
R1176 3.3K
C1172 470/6.3
SW1151
R
L
CN1152
1 H. DEF
2 —
3 H. DEF
4 —
5
6 V. DEF
7 V. DEF
RED
BLU
GRN
YEL
L1151
H. DEFLECTION
V. DEFLECTION
VIDEO
EVF-2 P.C.B
A
B
C
D
E
1
2
3
4
5
6
7
8

NOTE: MARK "●" IS CHIP COMPONENT.


C1167
TP1154
RV1152
CN1152
C1166
IC1151
R1165
C1175
R1172
C1164
R1157
R1162
Q1153
R1166
C1169
R1164
R1163
R1167
SW51
C1173
R1156
C1157
C1156
C1155
C1162
RV1151
R1158
C1159
R1152
R1153
R1161
C1165
C1160
Q1152
R1170
D1151
R1178
Q1151
R1159
R1160
TP1153
C1153
C1158
R1154
C1152
C1168
R1169
D1152
R1173
R1171
C1174
C1154
R1155
TP1152
R1151
R1168
C1172
R1177
C1163
C1151
TP1151
C1170
R1174
RV1153
R1176
CN1151
C1171
R1175

EVF-2 P.C.B


CN1101
CN1102
R1101
LV1101
L1107
R1129
L1101
R1104
C1104
Q1103
L1103
C1110
RV1101
Q1101
D1102
R1117
R1102
R1107
C1118
R1118
L1105
R1103
R1106
C1102
R1105
D1103
L1104
C1116
C1117
R1125
C1111
C1101
C1103
C1113
C1112
R1122
R1124
C1121
R1109
R1108
R1110
C1105
R1123
Q1104
Q1102
R1121
C1119
RV1102
TP1101
TP1102
R1114
R1115
R1116
C1109
D1104
C1107
R1126
R1113
R1120
R1128
L1102
R1127
R1112
D1101
R1119
Q1105
C1122
C1108
C1114
C1115
CN1103
RV1103
T1

EVF-1 P.C.B

CN1101

1	5 V
2	GND
3	EVF VIDEO IN
4	VIDEO GND
5	9 V

To
EVF
CONNECTOR

CN1152

1	H. DEF
2	——
3	H. DEF
4	——
5	——
6	V. DEF
7	V. DEF

To
DEFLICTION

CN1103

1	G
2	—
3	KH
4	H
5	CG
6	—
7	S
8	—
9	F

To
CRT SOCKET

CN1151

1	GND
2	VIDEO
3	5 V
4	V. BLANK
5	4.8 V
6	9 V
7	H. DEF
8	——
9	H. DEF
10	H. PULSE
11	——
12	H. DRIVE
13	GND

To
EVF-1
CN1102

IC1151

		17	
16	0	1	1.1
15	1.7	2	2.7
14	5.0	3	2.8
13	2.6	4	1.6
12	2.6	5	4.7
11	2.0	6	2.2
10	1.3	7	2.2
9	1.5	8	0.6
		18	0

CN1102

1	GND
2	VIDEO
3	5 V
4	V. BLANK
5	4.8 V
6	9 V
7	H. DEF
8	——
9	H. DEF
10	H. PULSE
11	——
12	H. DRIVE
13	GND

To
EVF-2
CN1101

Q1101

B	1.5
C	3.4
E	0.8

Q1102

B	−1.3
C	−24.8
E	−0.6

Q1103

B	0.3
C	8.5
E	0

Q1104

B	−0.2
C	1.1
E	0

Q1151

B	
C	
E	

Q1152

B	
C	8.9
E	5.0

Q1153

B	
C	4.8
E	0

▨ Soldered side

▨ Parts side

● Through- hole

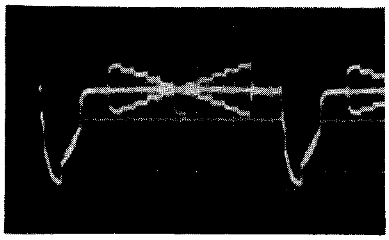
E D C B A

1 2 3 4 5 6 7 8

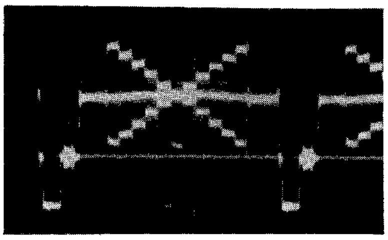
WAVEFORMS

EVF-1

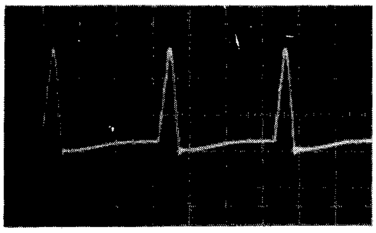
CN1103-1
5V/10 µsec • div



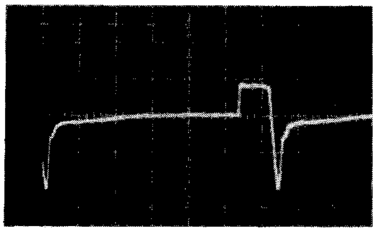
CN1103-3
0.2V/10 µsec • div



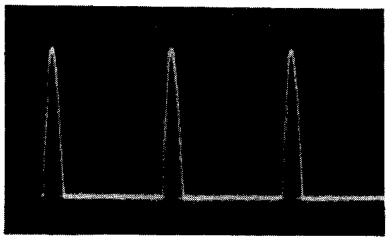
Q1105-COLLECTOR
5V/20 µsec • div



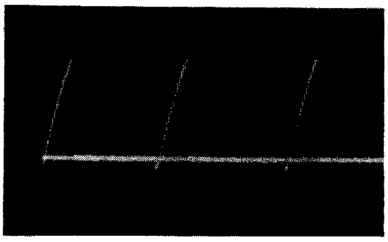
Q1102-BASE
1V/10 µsec • div



Q1103-COLLECTOR
20V/20 µsec • div

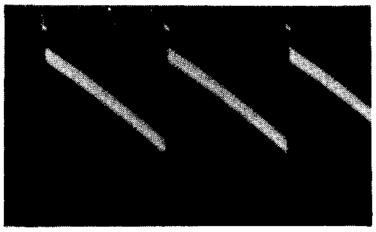


CN1103-7
10V/20 µsec • div

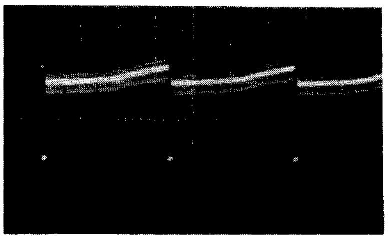


EVF-2

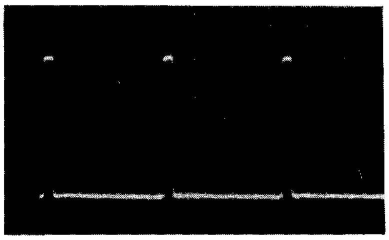
Q1152-EMITTER
2V/5msec • div



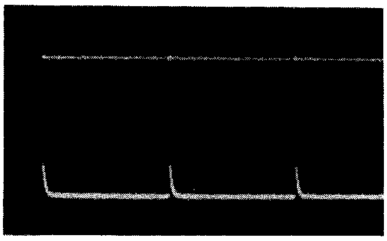
IC1151-1
0.5V/5msec • div



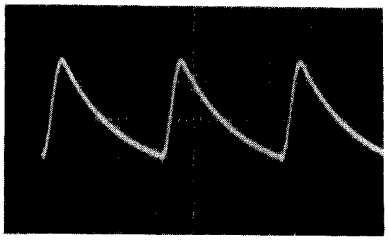
IC1151-8
1V/20 µsec • div

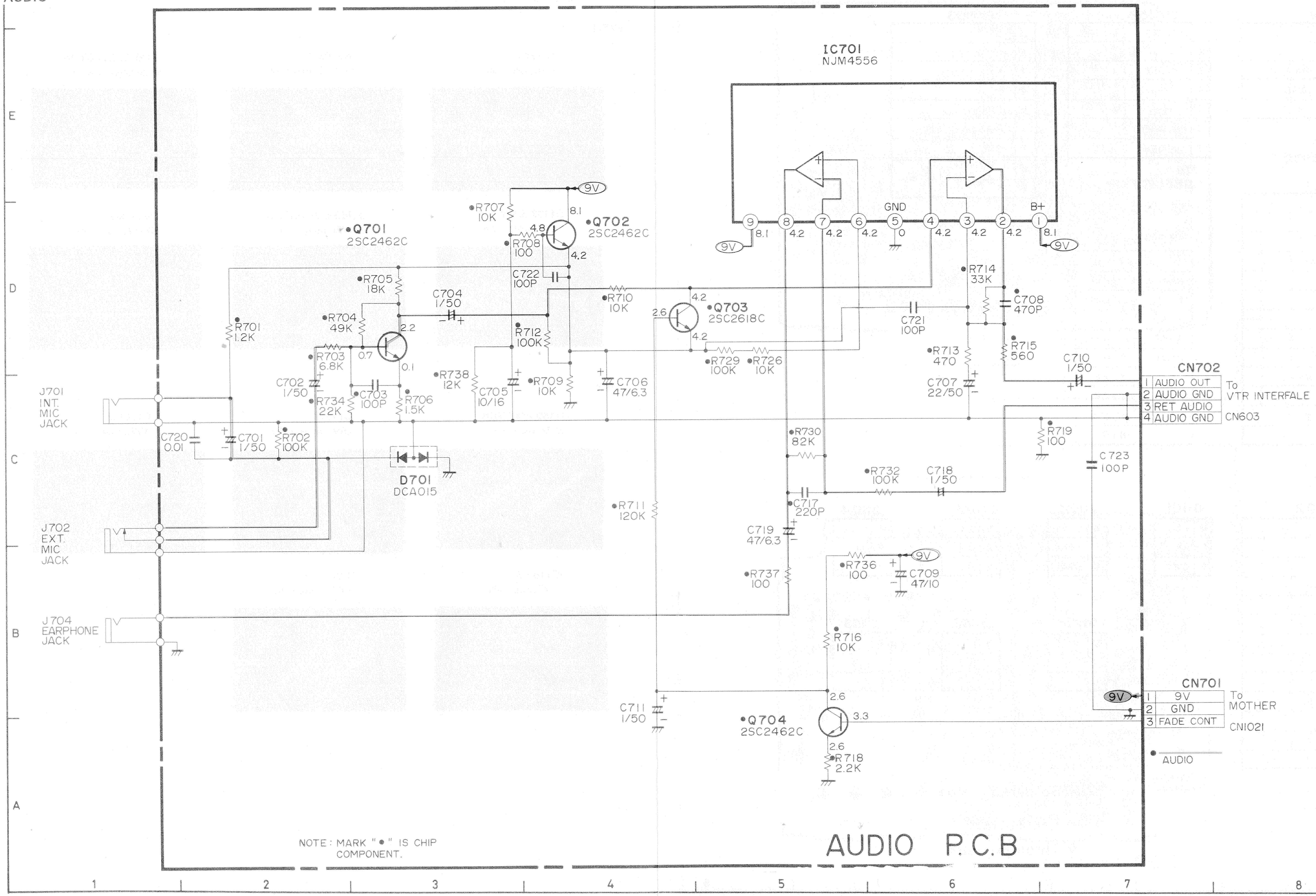


IC1151-8
1V/5msec • div



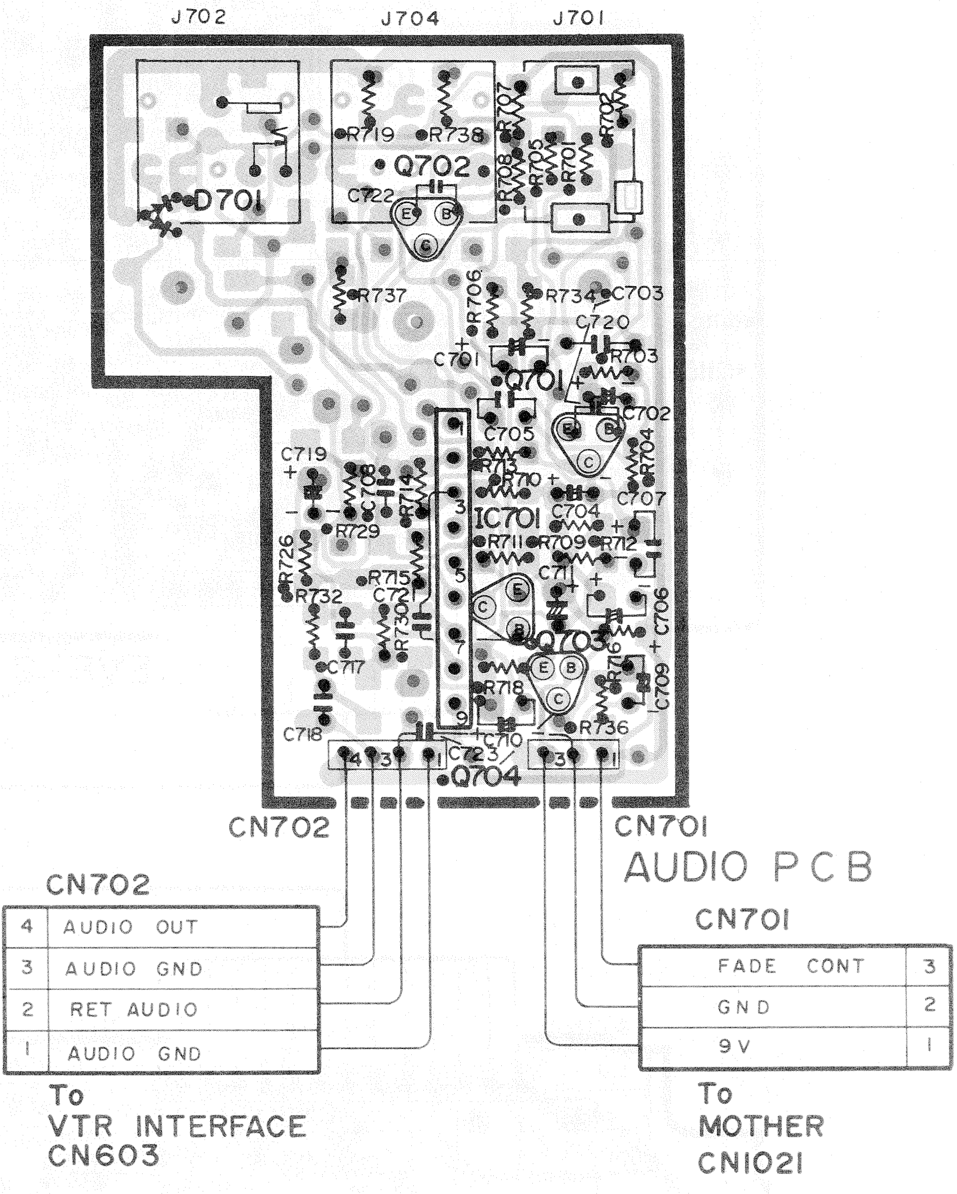
IC1151-11
0.5V/20 µsec • div




IC701
NJM4556
GND
B+
9V
8.1
4.2
0
Q701
2SC2462C
Q702
2SC2462C
Q703
2SC2618C
Q704
2SC2462C
R701 1.2K
R702 100K
R703 6.8K
R704 49K
R705 18K
R706 1.5K
R707 10K
R708 100
R709 10K
R710 10K
R711 120K
R712 100K
R713 470
R714 33K
R715 560
R716 10K
R718 2.2K
R719 100
R726 10K
R729 100K
R730 82K
R732 100K
R734 22K
R736 100
R737 100
R738 12K
C701 1/50
C702 1/50
C703 100P
C704 1/50
C705 10/16
C706 47/6.3
C707 22/50
C708 470P
C709 47/10
C710 1/50
C711 1/50
C717 220P
C718 1/50
C719 47/6.3
C720 0.01
C721 100P
C722 100P
C723 100P
D701
DCA015
J701 INT. MIC JACK
J702 EXT. MIC JACK
J704 EARPHONE JACK
CN702
1 AUDIO OUT
2 AUDIO GND
3 RET AUDIO
4 AUDIO GND
To VTR INTERFALE
CN603
CN701
1 9V
2 GND
3 FADE CONT
To MOTHER
CN1021
AUDIO
NOTE: MARK "●" IS CHIP COMPONENT.
AUDIO P.C.B
A
B
C
D
E
1
2
3
4
5
6
7
8

IC701

1	8.1
2	4.2
3	4.2
4	4.2
5	0
6	4.2
7	4.2
8	4.2
9	8.1


J702
J704
J701
D701
R719
R738
Q702
C722
E
B
C
R707
R708
R705
R701
R702
R737
R706
R734
C703
C720
C701
R703
Q701
C702
C705
R704
C719
R713
R710
C707
C708
R714
IC701
C704
R729
R711
R709
R712
R726
R715
C711
R732
C721
R730
C706
Q703
R716
C717
R718
C709
R736
C718
C723
C710
Q704
1
3
5
7
9
4
3
1
CN702
CN701
AUDIO PCB
CN702
4 AUDIO OUT
3 AUDIO GND
2 RET AUDIO
1 AUDIO GND
To VTR INTERFACE CN603
CN701
FADE CONT 3
GND 2
9V 1
To MOTHER CN1021

▨ Soldered side

░ Parts side

● Through-hole

Q701

B	0.7
C	2.2
E	0.1

Q702

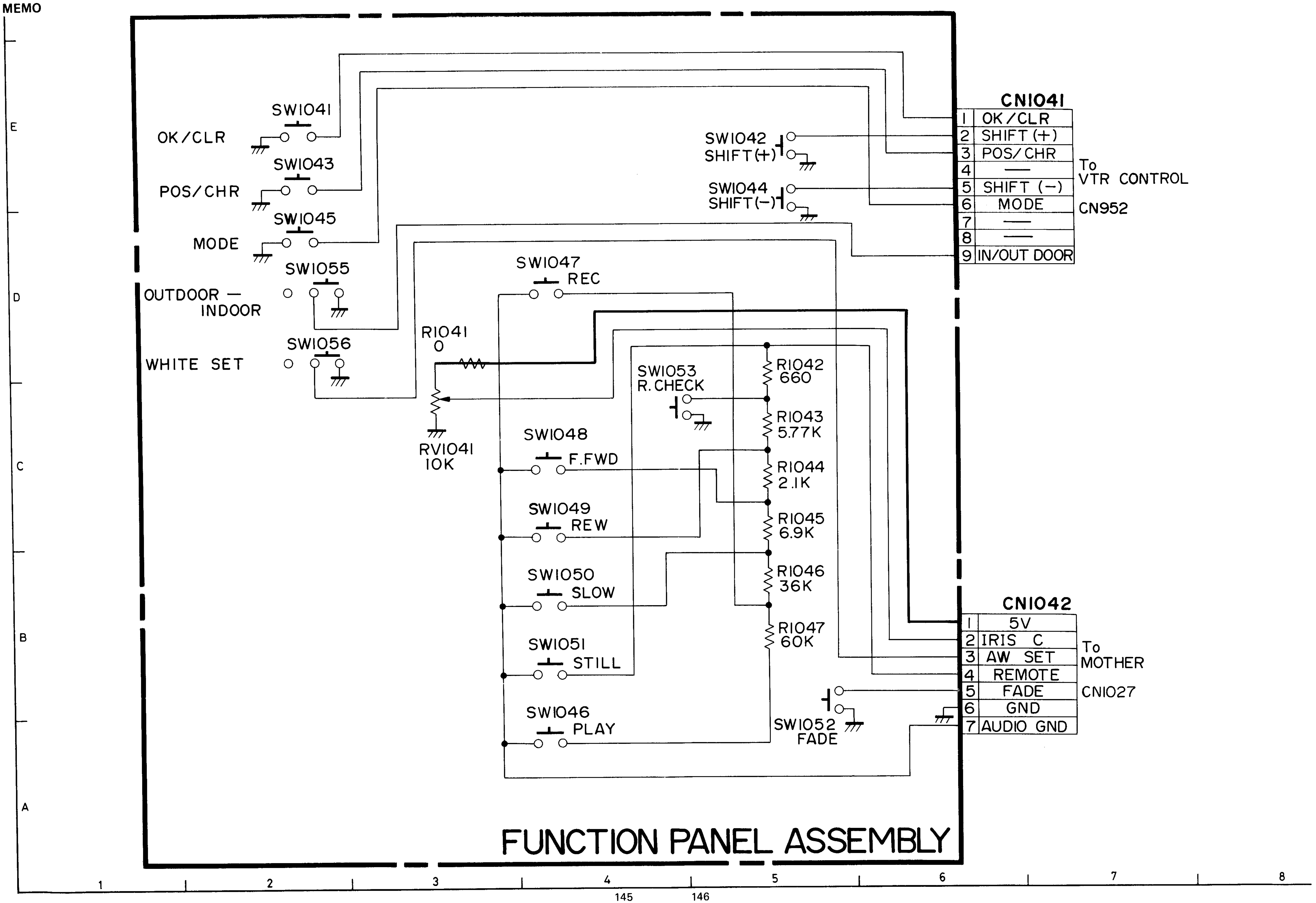
B	4.8
C	8.1
E	4.2

Q703

B	2.6
C	4.2
E	4.2

Q704

B	3.3
C	2.6
E	2.6

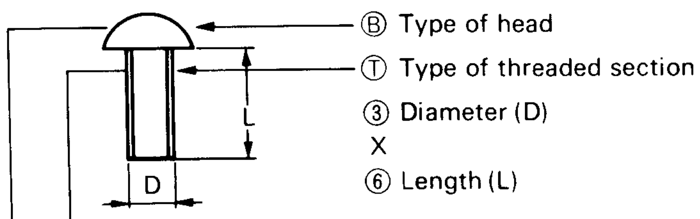

FUNCTION PANEL ASSEMBLY

MEMO
E
D
C
B
A
1
2
3
4
5
6
7
8
SW1041
OK/CLR
SW1043
POS/CHR
SW1045
MODE
SW1055
OUTDOOR — INDOOR
SW1056
WHITE SET
R1041
0
RV1041
10K
SW1047
REC
SW1048
F.FWD
SW1049
REW
SW1050
SLOW
SW1051
STILL
SW1046
PLAY
SW1053
R.CHECK
R1042
660
R1043
5.77K
R1044
2.1K
R1045
6.9K
R1046
36K
R1047
60K
SW1042
SHIFT(+)
SW1044
SHIFT(−)
SW1052
FADE
CN1041
1 OK/CLR
2 SHIFT (+)
3 POS/CHR
4 —
5 SHIFT (−)
6 MODE
7 —
8 —
9 IN/OUT DOOR
To VTR CONTROL
CN952
CN1042
1 5V
2 IRIS C
3 AW SET
4 REMOTE
5 FADE
6 GND
7 AUDIO GND
To MOTHER
CN1027

EXPLODED VIEWS

SCREW CLASSIFICATION

Example: BT3 × 6



Ⓑ Type of head
Ⓣ Type of threaded section
③ Diameter (D)
X
⑥ Length (L)
L
D

Abbre-viation	Name	Shape
No symbol	Brazier head	
P	Pan head	
B	Binding head	
O	Oval countersunk head	
F	Flat countersunk head	

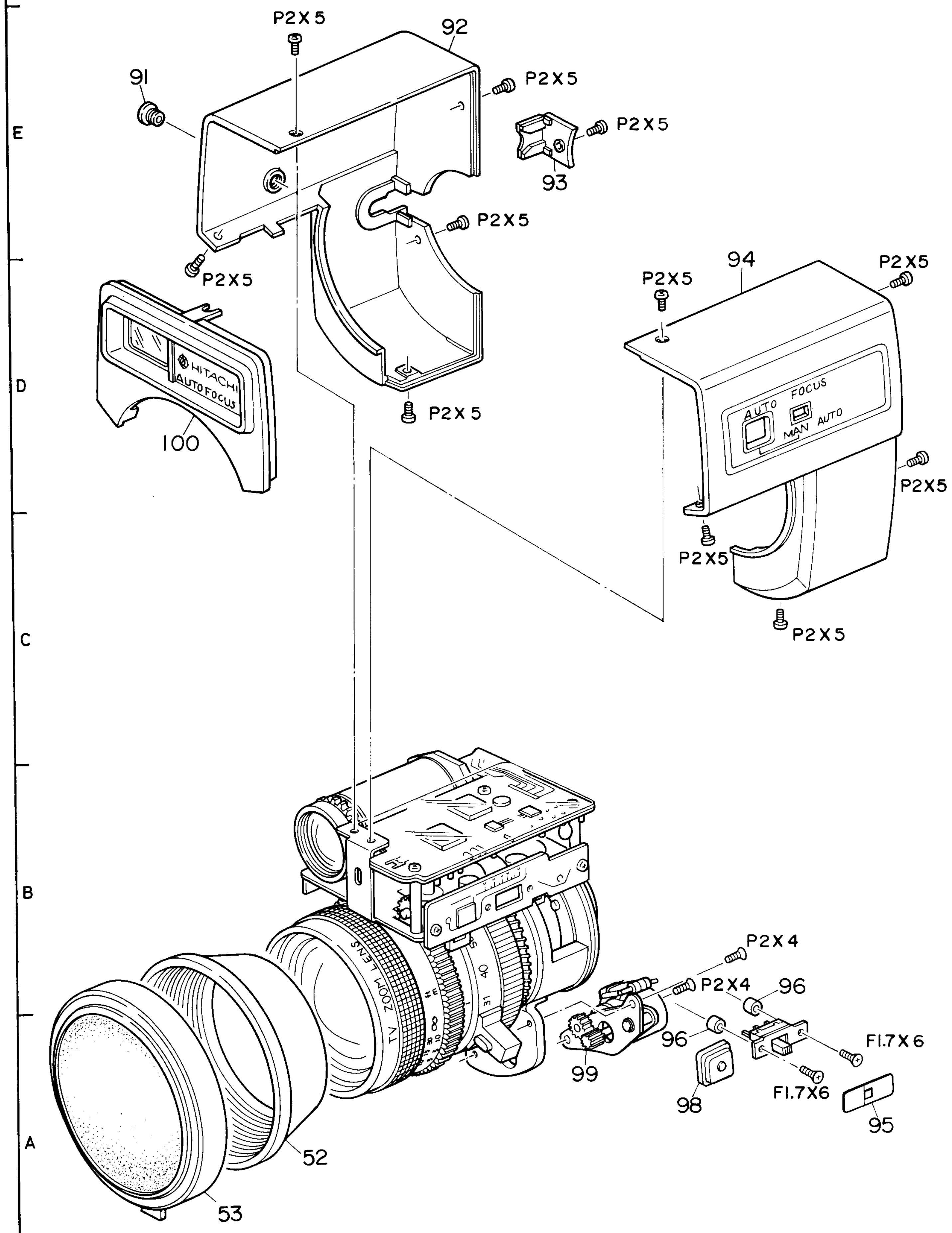
Abbre-viation	Name	Shape
No symbol	Machine (clamps without tapping)	
t	Tapping (clamps with tapping) Type 1	
T	Tapping (clamps with tapping) Type 2	
f	Forming tight (for metal)	
Note	Since the forming tight screw tightens while self-tapping machine screws can be replaced by tapping screws.	

Washers and Nuts

Abbre-viation	Name	Shape
W LW LW	Washer Spring washer Locking washer	◎
E	E-ring	
N	Nut	⬡
Note	Internal dia is indicated for nuts and washers.	

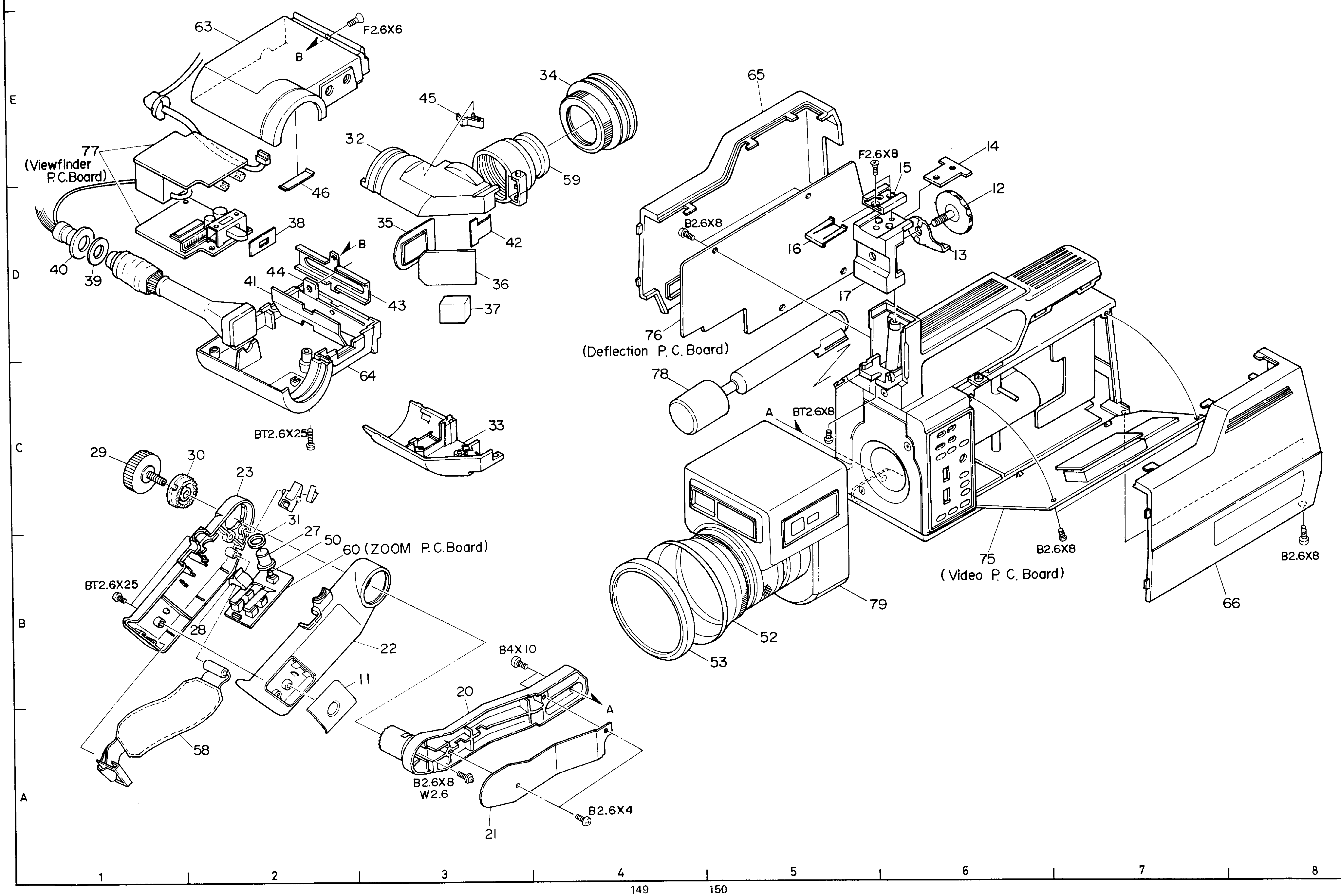
MEMO

Lens

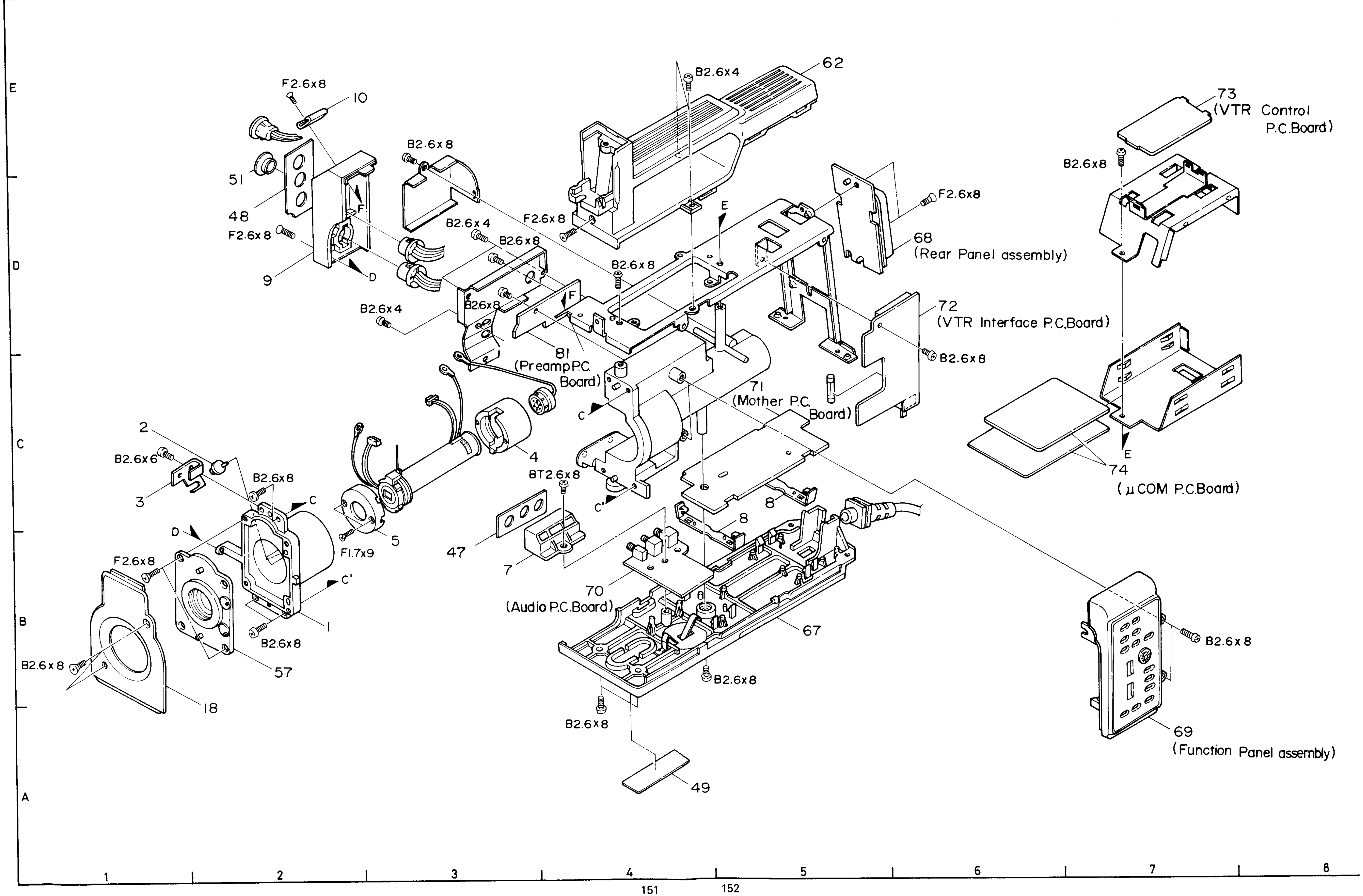


P2X5
92
91
P2X5
93
P2X5
P2X5
P2X5
94
P2X5
P2X5
HITACHI
AUTO FOCUS
100
P2X5
AUTO FOCUS
MAN AUTO
P2X5
P2X5
P2X5
P2X4
P2X4
96
96
F1.7X6
99
F1.7X6
98
95
TV ZOOM LENS
52
53
E
D
C
B
A
1
2
3
4

Case · Electronic Viewfinder


63
F2.6X6
B
34
65
45
32
59
77
(Viewfinder
P.C.Board)
46
F2.6X8
14
15
12
38
35
42
B2.6X8
16
13
40
39
B
44
41
43
36
37
17
76
(Deflection P. C. Board)
64
78
A
BT2.6X8
BT2.6X25
33
29
30
23
31
27
50
60 (ZOOM P.C.Board)
BT2.6X25
28
22
11
75
(Video P. C. Board)
B2.6X8
B2.6X8
66
79
52
53
B4X10
20
A
58
B2.6X8
W2.6
B2.6X4
21
E
D
C
B
A
1
2
3
4
5
6
7
8

Chassis


E
D
C
B
A
1
2
3
4
5
6
7
8
F2.6x8
10
51
48
F2.6x8
9
D
F
B2.6x8
B2.6x4
B2.6x8
B2.6x4
B2.6x8
F
81
(Preamp P.C.
Board)
F2.6x8
B2.6x4
62
E
B2.6x8
F2.6x8
68
(Rear Panel assembly)
72
(VTR Interface P.C.Board)
B2.6x8
71
(Mother P.C.
Board)
73
(VTR Control
P.C.Board)
B2.6x8
E
74
(μCOM P.C.Board)
2
B2.6x6
3
B2.6x8
C
D
F2.6x8
C'
1
B2.6x8
57
B2.6x8
18
5
F1.7x9
4
C
C'
BT2.6x8
47
7
8
8
70
(Audio P.C.Board)
67
B2.6x8
B2.6x8
49
69
(Function Panel assembly)
B2.6x8

REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
C 3	0247001	CERAMIC CHIP 22PF+-5%
C 4	0247006	CERAMIC CHIP 0.01MF+80-20%
C 12	0247054	CERAMIC CHIP 1000PF+-10%
C 17	0247028	CERAMIC CHIP 56PF+-5% (E)
C 21	0247029	CERAMIC CHIP 68PF+-5%
C 22	0247006	CERAMIC CHIP 0.01MF+80-20%
C 29	0247024	CERAMIC CHIP 27PF+-5% (E)
C 30	0247024	CERAMIC CHIP 27PF+-5%
C 48	0247024	CERAMIC CHIP 27PF+-5%
C 59	0247028	CERAMIC CHIP 56PF+-5%
C 62-63	0247006	CERAMIC CHIP 0.01MF+80-20%
C 64	0247024	CERAMIC CHIP 27PF+-5%
C 68-70	0247006	CERAMIC CHIP 0.01MF+80-20%
C 73	0247022	CERAMIC CHIP 15PF+-5%
C 74	0247031	CERAMIC CHIP 100PF+-5%
C 75-76	0247006	CERAMIC CHIP 0.01MF+80-20%
C 79	0247024	CERAMIC CHIP 27PF+-5% (E)
C 80	0247006	CERAMIC CHIP 0.01MF+80-20%
C 93	0247026	CERAMIC CHIP 39PF+-5% 50V
C 94	0247006	CERAMIC CHIP 0.01MF+80-20%
C 251-256	0247030	CERAMIC CHIP 82PF+-5%
C 257	0247026	CERAMIC CHIP 39PF+-5% 50V
C 257	0247026	CERAMIC CHIP 39PF+-5% 50V
C 259	0247006	CERAMIC CHIP 0.01MF+80-20%
C 259	0247026	CERAMIC CHIP 39PF+-5% 50V
C 260	0247020	CERAMIC CHIP 10PF +-0.5PF
C 261	0247006	CERAMIC CHIP 0.01MF+80-20%
C 264	0247006	CERAMIC CHIP 0.01MF+80-20%
C 307	0247006	CERAMIC CHIP 0.01MF+80-20%
C 311	0247006	CERAMIC CHIP 0.01MF+80-20%
C 325	0247006	CERAMIC CHIP 0.01MF+80-20%
C 350	0247035	CERAMIC CHIP 220PF+-5%
C 352	0247054	CERAMIC CHIP 1000PF+-10%
C 502	0247006	CERAMIC CHIP 0.01MF+80-20%
C 510	0247027	CERAMIC CHIP 47PF+-5%
C 703	0247031	CERAMIC CHIP 100PF+-5%
C 717	0247035	CERAMIC CHIP 220PF+-5%
C 802-803	0247031	CERAMIC CHIP 100PF+-5%
C 807	0247023	CERAMIC CHIP 22PF+-5%
C 808	0247006	CERAMIC CHIP 0.01MF+80-20%
C 809	0247021	CERAMIC CHIP 12PF+-5%
C 875	0247006	CERAMIC CHIP 0.01MF+80-20%
C 877-878	0247006	CERAMIC CHIP 0.01MF+80-20%
C 883	0247006	CERAMIC CHIP 0.01MF+80-20%
CV 1	5058534	TRIMMER
CV 251	5058534	TRIMMER
CV 251	5058536	TRIMMER
CV 501	5058536	TRIMMER
C1101	5152354	COIL
C1111	0247006	CERAMIC CHIP 0.01MF+80-20%
C1119	0247023	CERAMIC CHIP 22PF+-5%
C1156	0247006	CERAMIC CHIP 0.01MF+80-20%
C1162	0247056	CERAMIC CHIP 2200PF+-20%
C1169	0247053	CERAMIC CHIP 2200PF+-20%
		RESISTORS
R 1	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R 5	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 6	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 7	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 8	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 9	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 10-11	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 12	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R 14	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 16	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 17	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 18-19	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 20	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R 21	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 22	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 23	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R 25	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 26-27	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 28	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W (E)
R 29	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 31	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 32	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R 33	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 35	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 36	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 37	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 38	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 39	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
R 40	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 43	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 44-45	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 49	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 50-51	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 52	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 53	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 54-55	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
		RESISTORS
R 56	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 59	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 60	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R 61	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R 85	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 86	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 88	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 90	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 92	0103842	CHIP RESISTOR 820OHM+-5% 0.1W
R 93	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 94	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 95	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 97-98	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 99	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 101	0103842	CHIP RESISTOR 820OHM+-5% 0.1W
R 102	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 103	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 104	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 105	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 106-107	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 108	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 109-110	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 111	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 112	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 113	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 114	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W (E)
R 115	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 117-118	0103842	CHIP RESISTOR 820OHM+-5% 0.1W
R 119	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 120	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 122	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 123	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 124	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 125	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R 127	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 128	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 129-130	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 131	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
R 132	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 133	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 134	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 135	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 136	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R 137	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 138	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R 139	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R 140	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 141	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 142	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 143	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 144	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 145	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 146	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 147-148	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 149-150	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 151	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 152	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 153	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 154	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 155	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 156	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 157	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 158	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 159	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 160	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 161-162	0103349	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 163	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 164	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 165	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 166	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 167	0103842	CHIP RESISTOR 820OHM+-5% 0.1W
R 168	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 169	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 170	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 171	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 172	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 179	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 183	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 184	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 185	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 186	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 188-189	0103842	CHIP RESISTOR 820OHM+-5% 0.1W
R 191	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 192	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R 193	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 194-195	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 196-197	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 198	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 199	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 202-203	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 204	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
		RESISTORS
R 205	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 206	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 207	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 208	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 210	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 211	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 212	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R 213	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 214	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R 215	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 222	0103836	CHIP RESISTOR 270OHM+-5% 0.1W
R 223	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 224	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 225	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 226	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 227	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 228	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W
R 229	0103876	CHIP RESISTOR 560KOHM+-5% 0.1W
R 230	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 231	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R 232	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 233	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 234	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R 238-240	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 251	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 251	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 252	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 252	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 253	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 253-254	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 254	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 255	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 255	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 256	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 256	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 257	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 257	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 258	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 259	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 301	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 302	0103877	CHIP RESISTOR 680KOHM+-5% 0.1W
R 303	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 304	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 305	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 306	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 307	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 308	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 309-310	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 311	0103836	CHIP RESISTOR 270OHM+-5% 0.1W (E)
R 312	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 313	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 314	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 315	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W
R 316	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 317	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R 318	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R 320	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 321-323	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 324	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 325	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 326	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 327	0103819	CHIP RESISTOR 10OHM+-5% 0.1W
R 328	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
R 329	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 330-331	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R 332	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 333	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 335	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 336	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 337	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 338	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 339	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 340	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 345-346	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 347-348	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 349-350	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R 366-367	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 368-369	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 370	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 371	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R 374	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 375	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 376	0103819	CHIP RESISTOR 10OHM+-5% 0.1W
R 377	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 378	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 379	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 380	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 382	5060081	RESISTOR BLOCK
R 383	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R 384	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 385	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
		RESISTORS
R 386	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R 387	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 388	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 389-390	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 391	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 392	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 393-396	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 397	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 398	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W
R 399	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 400	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 401-402	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 403-404	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 405	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 406	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R 407	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R 408	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 409	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 410	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 411	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 412	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 413	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 414	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 415	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 416	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 417	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 418	0103819	CHIP RESISTOR 10OHM+-5% 0.1W
R 419-422	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 451-452	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 453	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 454-455	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 456	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 457-458	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 459	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 460	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 461-462	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 463	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 464	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 465	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 466-467	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 468	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 469-470	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 471	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 472	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 473	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 474-475	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 476	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 477	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 478	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 502	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 503	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 504	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 505	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 506	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 507	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 508	0103827	CHIP RESISTOR 47OHM+-5% 0.1W
R 509	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R 510	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 511	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 512	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 513	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 515	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 516	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 517	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 519	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R 601-602	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 603	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 604	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 605	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 606	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 607	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 609	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 610	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 611	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 612	0103819	CHIP RESISTOR 10OHM+-5% 0.1W
R 613	0103827	CHIP RESISTOR 47OHM+-5% 0.1W
R 614	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R 615	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 617	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 618	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 619	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
R 620	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 621	0103838	CHIP RESISTOR 390OHM+-5% 0.1W
R 622	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 623	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 624	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 625	0103829	CHIP RESISTOR 68OHM+-5% 0.1W
R 626	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 627	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 628	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 629	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
		RESISTORS
R 630	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 634	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 635	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 636	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 638-639	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 640	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 641	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 701	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 702	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 703	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 704	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 705	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 706	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 707	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 708	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 709-710	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 711	0103868	CHIP RESISTOR 120KOHM+-5% 0.1W
R 712	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 713	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R 714	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 715	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R 716	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 718	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 719	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 726	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 729	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 730	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R 732	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 734	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 736-737	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 738	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 803	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 804	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 805	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 806	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 808	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 809	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 810	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 811	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 812	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 813-814	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 815	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 816-817	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 820-829	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 830-833	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R 834	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 835	0103835	CHIP RESISTOR 220OHM+-5% 0.1W
R 836	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 837-842	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 844-845	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 846-850	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 851	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R 852	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 857-858	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 859	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 860	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 861	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 862	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 864-865	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 880-881	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 884	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 885	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 886	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 887	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 888	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 889	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 890	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 891	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 892	0103833	CHIP RESISTOR 150OHM+-5% 0.1W
R 893	0103874	CHIP RESISTOR 390KOHM+-5% 0.1W
R 894-896	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 897	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W
R 898	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R 899	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 900-901	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 902	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 903	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 904-905	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 906	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 907	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 908	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 951	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 952	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 953	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 954	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 955	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 956	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 957	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 958	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 959	0103874	CHIP RESISTOR 390KOHM+-5% 0.1W
R1101	0103831	CHIP RESISTOR 100OHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
		RESISTORS
R1103	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R1104	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R1105	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R1106	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R1107	0103835	CHIP RESISTOR 220OHM+-5% 0.1W
R1108	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W
R1109	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R1110	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R1112	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1113	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1114	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R1115	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R1116	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R1117	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1118	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R1119-1120	0103881	CHIP RESISTOR 2.2MOHM+-5% 0.1W
R1121	0103821	CHIP RESISTOR 15OHM+-5% 0.1W
R1122	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1123	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1124	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R1125	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W
R1126	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R1127	0103881	CHIP RESISTOR 2.2MOHM+-5% 0.1W
R1128	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R1151	0103831	CHIP RESISTOR 100OHM+-5% 0.1W
R1152	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R1153	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R1154	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R1156	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1157	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R1159	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R1160	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R1161	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1162	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1165	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1166	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R1167	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R1168-1169	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1170	0103830	CHIP RESISTOR 82OHM+-5% 0.1W
R1171	0103824	HIP RESISTOR 27OHM+-5% 0.1W
R1172	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1173	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R1174	0103836	CHIP RESISTOR 270OHM+-5% 0.1W
R1175	0103824	HIP RESISTOR 27OHM+-5% 0.1W
R1176	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R1176	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1177	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1178	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
		SEMI-CONDUCTORS
D 1	5331592	DIODE 1SS133
D 2	5329851	DIODE DCB015
D 3	5331592	DIODE 1SS133
D 11	5331592	DIODE 1SS133
D 251	5330771	DIODE 1SV55
D 301	5332351	DIODE EU-1Z
D 303	5331592	DIODE 1SS133
D 306-307	5331592	DIODE 1SS133
D 310	5331592	DIODE 1SS133
D 312	5331592	DIODE 1SS133
D 451-456	5332491	DIODE EK04
D 457	5330532	DIODE SILICON HZ-12B 1.0M
D 601-602	5330101	RECTIFIER SILICON V06C 15K
D 603	5331592	DIODE 1SS133
D 605-607	5331592	DIODE 1SS133
D 804	5331592	DIODE 1SS133
D 806-807	5331592	DIODE 1SS133
D 875	5331592	DIODE 1SS133
D 959	5331592	DIODE 1SS133
D 962	5331592	DIODE 1SS133
D1101	5330132	DIODE 1S2076A
D1102	5331592	DIODE 1SS133
D1103	5332351	DIODE EU-1Z
D1104	5331592	DIODE 1SS133
D1151-1152	5331592	DIODE 1SS133
IC 1	5363781	IC AN2131LF
IC 2	5363721	IC AN2140LF
IC 3	5363771	IC AN2240LF
IC 4	5363761	IC AN2330LF
IC 9	5363751	IC AN2340LF
IC 10	5363741	IC AN2341LF
IC 11	5363711	IC AN2430LF
IC 12	5363891	IC MN8033 (E)
IC 13	5354711	IC DH-1308A
IC 201	5363871	IC HA11777MP
IC 251	5361391	IC MN6064R
IC 251	5363901	IC MN6064R
IC 301-302	5350601	IC NJM4558D
IC 303	5363921	IC NJM4556S
IC 304	5363791	IC NJM2904S
IC 451	5363731	IC BA6122A

SYMBOL-NO	P-NO	DESCRIPTION
		SEMI-CONDUCTORS
IC 601	5363911	IC NJM2903M
IC 701	5363921	IC NJM4556S
IC 801	5361431	IC UPD7508G-574
IC 803	5361361	IC MB88303
IC 804	5361381	IC UPD4514BC
IC 805	5361371	IC MSM58321RS
IC 875	5361411	IC UPD4508BC
IC 876-877	5363861	IC UPD4029BC
IC 878	5361401	IC HD14001BP
IC1151	5363881	IC HA11441
Q 1-4	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 5-6	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 7-9	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 10	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 13-18	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 19-20	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 22	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 25-29	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 30	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 31	5323411	TRANSISTOR 2SA781K
Q 32-33	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 34-35	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 40-41	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 42-43	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 301	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 302	5323621	TRANSISTOR 2SK430
Q 303-304	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 305-306	5322421	TRANSISTOR 2SA778AK
Q 307-308	5329831	TRANSISTOR 2SA1171D
Q 309	5329841	TRANSISTOR 2SC1653N3
Q 310-311	5329831	TRANSISTOR 2SA1171D
Q 314-315	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 316-317	5329781	MICRO PACKAGE TRANSISTOR 2SC2618RC
Q 321	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 322	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 324-326	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 451-454	5323531	TRANSISTOR 2SB740C
Q 455	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 456-457	5329841	TRANSISTOR 2SC1653N3
Q 501	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 502	5329601	TRANSISTOR 2SK322Q
Q 503	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 505-507	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 601	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 602	5329781	MICRO PACKAGE TRANSISTOR 2SC2618RC

SYMBOL-NO	P-NO	DESCRIPTION
Q 603	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 605	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 606-607	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 608	5329781	MICRO PACKAGE TRANSISTOR 2SC2618RC
Q 609	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 701- 702	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 703	5329781	MICRO PACKAGE TRANSISTOR 2SC2618RC
Q 704	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 801	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 803	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 804	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 875-876	5329821	TRANSISTOR 2SC1621B4
Q 879-880	5329821	TRANSISTOR 2SC1621B4
Q 881-883	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 884-888	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 889-892	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 893	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 894	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 951	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 952-954	5785431	TRANSISTOR DTA124S
Q 955	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 956-960	5785431	TRANSISTOR DTA124S
Q 967	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 969	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q 970	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q 972	5785431	TRANSISTOR DTA124S
Q1101	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q1102	5329761	MICRO PACKAGE TRANSISTOR 2SA1122CC
Q1103	5323631	TRANSISTOR 2SD974
Q1104	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
1105	5323421	TRANSISTOR 2SC1390A-F
Q1151	5329771	MICRO PACKAGE TRANSISTOR 2SC2462LC
Q1152-1153	5329781	MICRO PACKAGE TRANSISTOR 2SC2618RC
TH 1	5340213	THERMISTOR 32D27
		TRANSFORMERS
T 301	5271251	TRANSFORMER
T 451	5271281	TRANSFORMER
T1101	5271291	F.B.T
		COILS
L 1	5152331	CHOKE COIL 33UH+-10%
L 2	5152032	PEAKING COIL 220 MICROH
L 3	5152352	COIL
L 4-5	5152076	CHOKE COIL 15MICROH
L 6-7	5152343	CHOKE COIL
L 9	5150526	COIL
L 10-12	5152333	CHOKE COIL 47UH+-10%

SYMBOL-NO	P-NO	DESCRIPTION
		COILS
L 13	5152354	COIL
[illegible]	5152154	CHOKE COIL
L 17	5152352	COIL
L 251	5124201	COIL
L 302	5152324	CHOKE COIL 10UH+-10%
L 452	5152781	COIL
L 454	5152761	COIL
L 455	5159041	COIL
L 602	5152086	CHOKE COIL 82MICROH
LV1101	5120991	COIL
L1102	5152346	CHOKE COIL 470UH+-10%
L1103	5152354	COIL
L1104	5152351	CHOKE COIL
L1105	[illegible]	COIL
L1107	5152354	COIL
L1151	5272181	DEF YOKE
		CRYSTALS
X 251	5781071	CRYSTAL
[illegible]	[illegible]	CRYSTAL
X [illegible]	[illegible]	CRYSTAL
		MISCELLANEOUS
CN1103	5654071	CRT SOCKET
DL 1	5735461	DELAY LINE
DL 3	5735441	DELAY LINE
DL 4	5735451	DELAY LINE
DL 5	5765422	DELAY LINE (E)
DL 6	5162611	DELAY LINE
DL 7	5162622	DELAY LINE (E)
F 601	[illegible]	FUSE (E)
P1101	5882971	CABLE ASSY
SW 601	5623961	SWITCH
SW1011	5633671	PUSH SWITCH
SW1012	5633671	PUSH SWITCH
SW1013	5633671	PUSH SWITCH
SW1014	5633671	PUSH SWITCH
SW1015	5633671	PUSH SWITCH
[illegible]	[illegible]	SWITCH
V1101	[illegible]	CRT
		FOR FINAL ASSEMBLY
1	6978951	HOLDER
2	4500301	PIN
3	6878221	PIN HOLDER
4	6978941	HOLDER (B)
5	6978961	HOLDER (A)
6	6022321	COVER
7	6337651	HINGE
8	6878351	PANEL
9	6878231	MICROPHONE SHOU
10	6175021	COVER
11	6075381	KNOB-EVF
12	7386181	LOCK LEVER
13	7785251	NUT
14	7386151	SHOE
15	6537371	SPRING
16	6878381	HOLDER
17	6022311	FRONT COVER
18	6978931	GRIP BASE
19	6644451	BASE COVER
20	6878321	GRIP (A)
21	[illegible]	GRIP B
22	6067461	BUTTON
23	6878251	ZOOM LEVER
24	6075411	KNOB
25	6978921	HOLDER
26	7678661	CUSHION
27	6878361	NECK COVER
28	6878371	NECK COVER
29	6591601	EYE CAP
30	6644441	PLATE
31	6955321	MIRROR
32	7678651	CUSHION
33	6878331	SWITCH COVER
34	7789081	WASHER
35	7789091	WASHER
36	7684781	SHIELD COVER
37	6537341	SPRING
38	7386161	BRACKET
39	7386171	PLATE
40	6537351	SPRING
41	6537361	SPRING
42	6688551	PLATE
43	6688561	PLATE
45	4643182	RATING LABEL (E)
47	7746741	CUSHION
48	6878341	CAP
49	6878271	LENS HOOD
50	6878241	LENS CAP
51	6644401	LENS MOUNT
52	6335171	STRAP
53	6878111	LENS HOLDER
54	5961041	CIRCUIT "ZOOM"

SYMBOL-NO	P-NO	DESCRIPTION
		FOR FINAL ASSEMBLY
56	6878122	HOLDER (E)
58	6022221	TOP COVER-EVF
59	6022241	BOTTOM COVER-EVF
60	6022231	COVER (R)
61	6022261	COVER (L)
62	6022251	BOTTOM COVER
64	6208852	REAR PANEL (E)
66	6208861	PANEL
67	5961001	CIRCUIT "AUDIO"
68	5961071	CIRCUIT "MOTHER"
70	5938252	CIRCUIT "VTR INTERFASE" (E)
71	5961081	CIRCUIT "VTR CONTROL"
73	5961052	CIRCUIT "U CON" (E)
75	5961022	CIRCUIT "VIDEO" (E)
77	5961012	CIRCUIT "DEFLECTION" (E)
79	5961032	CIRCUIT "VIEWFINDER" (E)
80	5422011	MICROPHONE
81	6955601	ZOOM LENS ASSEMBLY
82	5961061	CIRCUIT "PRE AMP"
83	6881171	CAP
84	6023321	R-COVER
85	7388191	CABLE HOLDER
86	6023311	L-COVER
87	6881161	SWITCH PLATE
88	6881181	COLLER
89	6069031	AF BUTTON
90	5575611	ZOOM MOTOR
91	6023301	FRONT COVER